

Data Analysis

Reading a Table

Tables and graphs are used to organize and display information so it can be read quickly. To understand a table, it is important to read the title and the headings. The **title** tells what the table is about. The **headings** tell what information is found in the columns. The information related to each row is found in the columns.

The **title** is the main description of the table.

Volunteers for the Fundraiser

Read each **column** from top to bottom.

Headings describe the columns.

Read each **row** from left to right.

Job	Number of Volunteers	Group Leader
Answering Phones	12	R. Miller
Making Deliveries	15	M. Lopez
Cleaning	6	T. Sanks
Cooking	8	F. Chu

PRACTICE

Use the table above to answer each question.

- What does this table describe?
 - A telephones
 - B different types of jobs
 - C cooking
 - D people who are helping out at a fundraiser

- What is this part of the table called?

Making Deliveries	15	M. Lopez
-------------------	----	----------

- F a column
- G a row
- H a heading
- J the title

- What does this column in the table tell you?

12
15
6
8

- A the number of hours each person worked
- B the number of phones
- C the number of people who offered to help with each job
- D There is no way to tell.

- What is found in the third column of the table?

- F the person who is leading each group of workers
- G cleaning
- H cooking
- J the names of the people who wrote the table

Exact information can be found in the box, or cell, where the row and column meet.

Example

What does Video Bargain charge to rent a regular video for 5 days?

- Find the row labeled *Regular Videos*.
- Find the *Days* column for 5 days.
- Go across the row and down the column to find where the two meet. That cell has the information you are looking for.

Video bargain charges \$3 to rent a regular video for 5 days.

Video Bargain's Rental Fees

	Number of Days		
	1	3	5
Regular Videos	\$1.00	\$2.00	\$3.00
New Releases	\$2.50	\$5.00	\$7.50
Video Games	\$1.75	\$3.25	\$6.50

PRACTICE

Use the table above to answer these questions.

- | | |
|--|--|
| <p>5. How much does it cost to rent a regular video for 3 days? _____</p> <p>6. How much does it cost to rent a video game for 5 days? _____</p> <p>7. You rent a video game for 3 days and a regular video for 3 days. How much do you pay? _____</p> <p>8. What can you rent for \$1.35 or less? _____</p> <p>9. Which type of video is the most expensive to rent? _____</p> <p>10. What is the fee for renting a new release for 3 days? _____</p> | <p>11. <i>Revenge of the Zombies</i> just came out on video, and this store has it. Which row tells the cost to rent this movie?
_____</p> <p>12. You rent 2 video games on Monday and return them on Friday. What is the fee?
_____</p> <p>13. Which of these can be found in the table?
 A the charge for losing a video
 B whether this store is more expensive than others
 C the cost to rent a video
 D whether this store sells snacks
 E whether this store has foreign films</p> |
|--|--|

Using Numbers in a Table

You can use the numbers in a table to find additional information.

Examples

How many more years than Heidi has David been with the company?

Subtract to find the difference.

$$\text{Heidi} = 5 \text{ years; David} = 10 \text{ years} \quad 10 - 5 = 5$$

Heidi has been with the company 5 more years.

Clinton has been with the company 5 times as long as what other worker?

Divide the number of years for Clinton by 5.

$$\text{Clinton} = 10 \text{ years; } 10 \div 5 = 2$$

Linda has been with the company 2 years.

Clinton has been with the company 5 times as long as Linda.

Years with the Company

Employee	Years of Service
Anne Rodriguez	25
Clinton Reed	10
Linda Hansen	2
David Blume	10
Heidi Hunt	5
Myumi Kino	8

PRACTICE

Use the table above to fill in the blanks.

- Who has been with this company the shortest time? _____
- Who has been with the company longer, Myumi or David? _____
- How much longer has Clinton been with the company than Heidi? _____
- Who has been with the company 20 years longer than Heidi? _____
- Who has been with the company 4 times as long as Linda? _____
- How much longer than Clinton has Anne been with the company? _____

Use the table below for Numbers 7–9.

School Scores on State Test

School	Reading	Writing	Math
Lincoln	70	64	35
Thorpe	73	69	42
Tubman	86	73	57
Wiley	72	63	32
Roosevelt	64	55	32

- Which school had the highest math score? _____
- Which school had the lowest writing score? _____
- Lincoln's reading scores were how many times higher than their math scores? _____

Using a Price List

A price list is a commonly used type of table. Items are listed in a column with prices across from them—you find the item and look across for its price. If you need to find the total of several prices, it is a good idea to write each one and then do any figuring.

Swiftcopy Price List		
Copies		
Per Sheet	Single-sided	Double-sided
$8\frac{1}{2} \times 11$ B/W*	\$0.08	\$0.13
11×17 B/W	0.25	0.40
$8\frac{1}{2} \times 11$ Color	0.65	1.10
Add 2 cents per page for colored paper.		
Other Services		
Laminating	\$2.50 per sheet	
Spiral binding	\$1.50 per packet	
Plastic covers	\$2.50 per book	

*B/W = Black and White

PRACTICE

Use the price list above to answer these questions. Figure $8\frac{1}{2} \times 11$ paper unless a problem calls for a different size.

- How much would it cost to have 20 single-sided black and white copies on white paper? _____
- How much more would it cost to have the 20 single-sided copies printed on colored paper? _____
- If you have 1 double-sided copy printed on 11×17 paper and then have it laminated, how much will it cost? _____
- You have 20 double-sided copies printed on white paper. You then have the copies put together with a spiral binding. What is the total cost? _____
- How much will it cost for 10 single-sided color copies? _____
- Laura needs 10 double-sided copies. How much more will it cost for color than for black and white? _____
- How many black and white double-sided copies can Jason have made for 80 cents? _____
- Clarence needs 50 single-sided black and white copies. How much can he save if he has the pages printed on two sides of the paper instead of just one? _____

Finding Mean, Median, and Mode

When talking about a set of data, it is often useful to have a typical number to represent the data. Three ways to find a typical number for the data are to calculate the **mean**, the **median**, and the **mode**. The data in the table “Years with the Company” is used in the examples below.

Years with the Company

Employee	Years of Service
Anne Rodriguez	25
Clinton Reed	10
Linda Hansen	2
David Blume	10
Heidi Hunt	5
Myumi Kino	8

Mean

Mean is another word for **average**. To find the mean, or average, add up all of the values and then divide the total by the number of values you added.

Example What is the average number of years of service for the six people at the company?

- Add the number of years together. $25 + 10 + 2 + 10 + 5 + 8 = 60$
- Divide by 6, the number of people. $60 \div 6 = 10$

The average number of years of service is 10 years.

Median

The median is the number in the middle of the set of numbers that are arranged in order from least to greatest. Half of the numbers in the set will be greater than the median and half will be less than the median.

Example What is the median number of years the workers have been with the company?

- Write the numbers in order from least to greatest. $2, 5, 8, 10, 10, 25$
- Circle the number in center of the list. In this set of data there is an even number of values, so there are 2 center values. $2, 5, \textcircled{8}, \textcircled{10}, 10, 25$
- When there are 2 center values, find their average. $10 + 8 = 18$ $18 \div 2 = 9$

The median number of years the workers have been with the company is 9 years.

Mode

The mode is the number that appears most often in a set of numbers. There can be more than one mode. If no number appears more often than others, there is no mode.

Example What is the mode for the data in the chart of years with the company?

- Write the numbers in the set of data. $25, 10, 2, 10, 5, 8$
- Look to see if one number appears more often than the others. In this set of data, the number 10 appears twice. All other numbers appear once.

The mode of the data is 10 years.

PRACTICE

Complete the table.

1. **Bargains Galore Telephone Orders**

Operator	Minutes Spent on Each Call						Median	Mode	Mean
	1	2	3	4	5	6			
A	2	2	4	6	3	1	2.5		3
B	3	3	5	4	5	4		None	
C	2	2	1	2	3	2			
D	6	5	5	6	8	X			

Find the median and the mode for each situation described.

2. Gwen did 5 speed tests in her typing class. Her times, in minutes, were 2, 3, 2, 5, and 4.

median time: _____

mode: _____

3. Ron sold 15 raffle tickets, Jan sold 35, Claudio sold 23, Nunzio sold 47, and Erin sold 23.

median number of tickets sold: _____

mode: _____

4. On a math quiz, Jean and her friends got the following scores: 65, 78, 63, 78, 97, 42, and 53.

median score: _____

mode: _____

5. Price of a CD at area record stores: \$9.50, \$12, \$14.50, \$12, \$12.50, \$13

median price: _____

mode: _____

Find the mean (average) for each set of data.

6. There are 3 women in Jenny's study group. One is 52 years old, one is 29, and one is 39.

What is the average age of the women in the study group? _____

7. Nathan asked coworkers how far they traveled from home to work each day. These were the distances reported: 2.5 miles, 4 miles, 9 miles, 3 miles, and 6.5 miles. What was the average distance traveled to get to work? _____

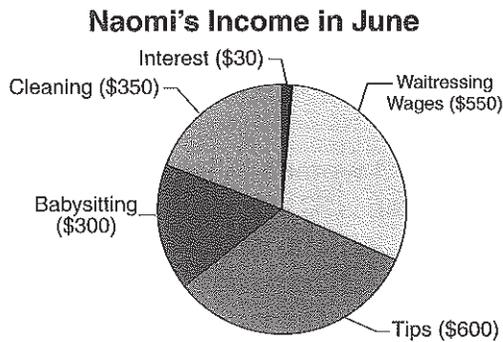
8. These are the amounts Dora spent on grocery bills for the past 6 weeks: \$90, \$100, \$58, \$60, \$77, and \$65. What was the average (mean) amount Dora spent on groceries each week? _____

9. Mrs. Jones tutors 5 students. One is 7 years old, three are 9 years old, and one is 11 years old. What is the average age of Mrs. Jones' students? _____

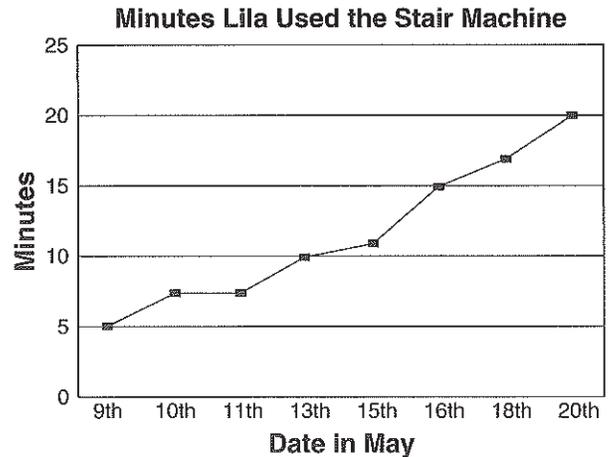
Working with Graphs

Graphs are used in newspapers, magazines, and even in reports on TV. They present information in picture form to help you read and understand the information quickly. Different types of graphs are used for different purposes. The three types of graphs shown here are the circle graph, the line graph, and the bar graph.

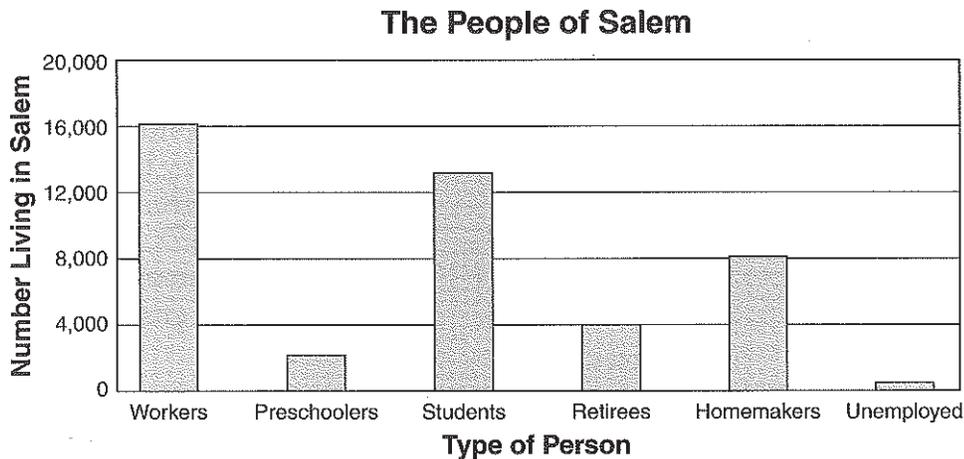
In a **circle graph**, a circle, which represents a whole amount, is divided into slices or wedges. Each slice represents one part of the whole.



A **line graph** uses points or dots to show values. Lines connect the points to show rising or falling values. This type of graph is used to show how data change over time.

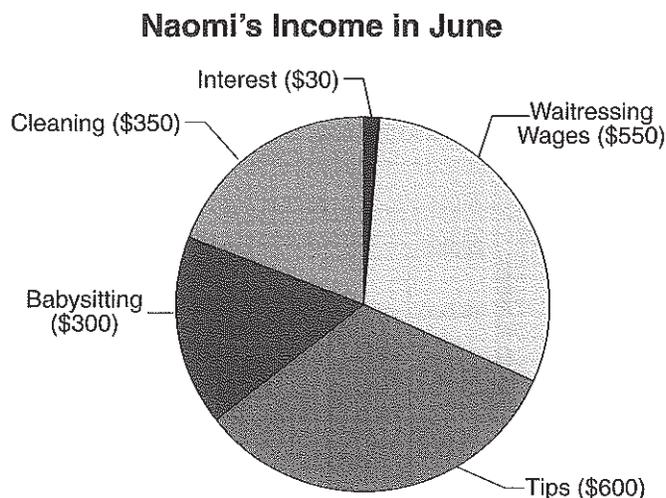


A **bar graph** uses thick lines or bars to represent values. Bar graphs make it easy to compare one category with another.



Reading a Circle Graph

Circle graphs, which are sometimes called pie charts, show a whole that is divided into sections. Each section or "slice" of the circle represents one category of information. The greater the amount being represented, the larger the section or slice. A circle graph makes it easy to compare sections with the whole and with each other. In the circle graph at right, for example, it is very easy to see that the least amount of Naomi's June income came from interest.



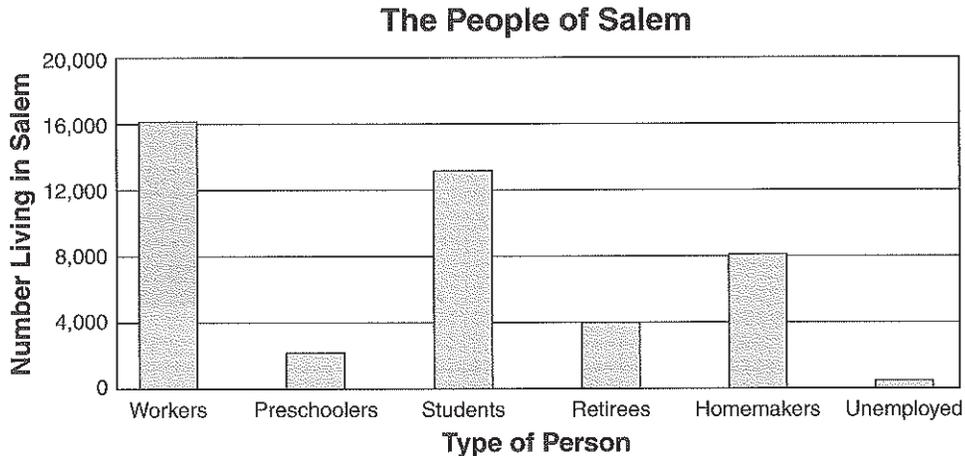
PRACTICE

Use the graph above to answer these questions.

- Approximately what fraction of Naomi's June income came from babysitting?
A $\frac{1}{2}$ C $\frac{1}{6}$
B $\frac{2}{3}$ D $\frac{3}{4}$
- About what fraction of Naomi's June income came from tips?
F $\frac{1}{5}$ H $\frac{1}{4}$
G $\frac{1}{3}$ J $\frac{1}{2}$
- Approximately what part of Naomi's June income was from waitress wages and tips?
A $\frac{2}{10}$ C $\frac{2}{4}$
B $\frac{2}{5}$ D $\frac{2}{3}$
- Which of these made up the greatest amount of Naomi's income in June?
F cleaning H interest
G babysitting J tips
- Together, babysitting and tips made up about what fraction of Naomi's June income?
A $\frac{1}{5}$ C $\frac{1}{4}$
B $\frac{1}{3}$ D $\frac{1}{2}$
- What was Naomi's total income in June?
F \$1,830 H \$1,650
G \$1,630 J \$1,850
- Did Naomi make more money from tips or from cleaning?
A tips B cleaning
- If Naomi becomes a manager, her wages will double but she will not get any tips. Would she make more money or less money being a manager instead of waiting on tables?
F more money G less money

Reading a Bar Graph

A bar graph uses thick lines or bars to represent values. Each bar is labeled, and the number for the group it represents is determined by the height of the bar. Information is found along the **horizontal** and **vertical** axes. The categories are usually found along the horizontal axis and the numbers along the vertical axis.



If the top of a bar does not line up exactly with a number, you can estimate its value. For example, in the graph above, the bar for preschoolers is about halfway between 0 and 4,000. Since 2,000 is equal to half of 4,000, a good estimate for the number of preschoolers is 2,000.

PRACTICE

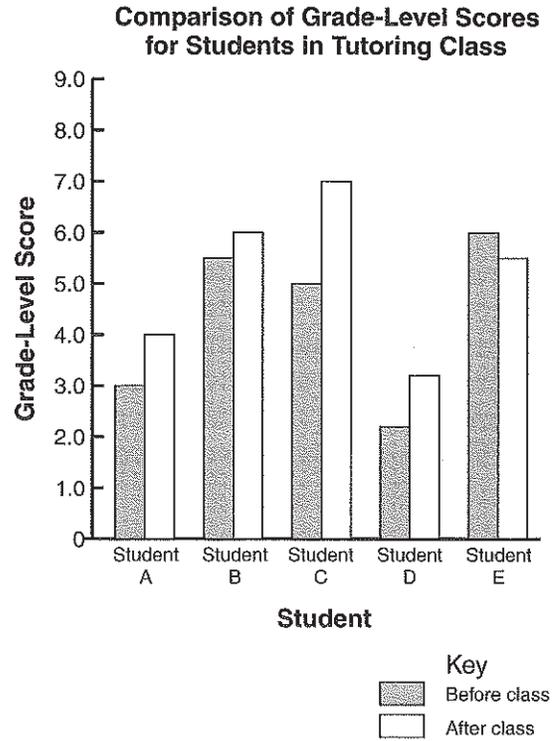
Use the graph above to answer these questions.

- Are there more students or homemakers in Salem? _____
- Which category has the least number of people? _____
- About how many people living in Salem are retirees? _____
- Approximately how many more workers are there in Salem than retirees? _____
- Which of these is the best estimate of the number of students in Salem?
A 12,000 C 13,000
B 15,000 D 16,000
- Approximately how many more retirees than preschoolers are there?
F 1,000 H 2,000
G 3,000 J 4,000
- Which of the following is the closest estimate of the total number of people represented in the graph?
A 20,000 C 40,000
B 80,000 D 100,000
- Who would find this graph most useful?
F a worker deciding when to retire
G a person considering whether to open a children's clothing store
H someone trying to decide the quality of the schools in Salem

Reading a Double Bar Graph

Double bar graphs show a comparison between two or more groups. Each group is represented by a bar of a different color. A key tells what the bars represent.

The graph at right compares the grade-level scores of students before taking a special tutoring class with their scores after taking the tutoring class.



PRACTICE

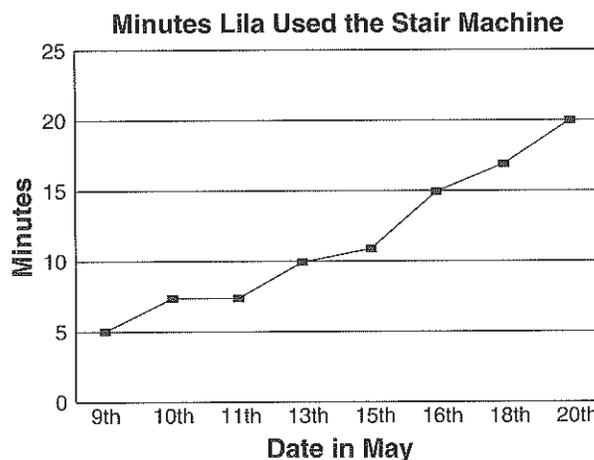
Use the graph above to answer these questions.

1. What was the grade-level score for Student A before taking the class? _____
2. What was the grade-level score for Student A after taking the class? _____
3. Does Student A's score show an increase or decrease? _____
4. By how much did Student A's score change? _____
5. Which student's grade-level score increased $\frac{1}{2}$ year? _____
6. Which student's score decreased after taking the class? _____
7. Which 2 students showed the same amount of change after taking the class? _____
8. Which student showed the greatest increase in score as a result of taking the class? _____

Reading a Line Graph

A line graph uses points or dots to show values. As in the bar graph, one axis of the line graph identifies categories and the other axis identifies numbers. Categories are usually listed on the horizontal axis and numbers on the vertical axis. To read the graph, find the point directly above the category and then read directly across to find the number.

Line graphs show changes in data over a period of time. The points are connected with lines that show how the values rise or fall. A graph that shows a continuing change in one direction is said to show a **trend**. A line that moves in an upward direction shows an increasing trend. A line that moves downward shows a decreasing trend.



PRACTICE

Use the graph above to answer these questions.

- How many minutes did Lila spend on the stair machine on May 9? _____
- On which 2 dates did Lila spend the same amount of time on the stair machine? _____
- How much more time did Lila spend on the stair machine on May 20 than on May 16? _____
- On which date did Lila spend 3 times as many minutes on the machine as she did May 9? _____
- By how many minutes did Lila's time on the machine increase from May 13 to May 16? _____
- Which of these is the best estimate of the average amount of time Lila spent on the stair machine?
A 5 minutes
B 8 minutes
C 12 minutes
D 17 minutes
- Which of these best describes what the graph shows?
F Lila is tired of the machine.
G Lila is spending more and more time on the stair machine.
H When Lila is sad, she spends no time on the stair machine.
- Does the graph show a trend? Explain.

Understanding Probability

When we talk about probability, we are talking about how likely it is for something to happen. Words used to describe probability include:

- | | |
|--|---|
| impossible—it cannot happen | equally likely—the chances are the same |
| not likely—the chances are <i>not</i> good | likely—the chances are good |
| certain—it is sure to happen | |

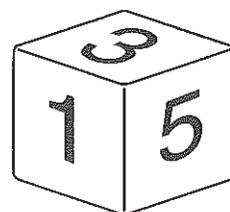
Probability can also be expressed with numbers. One way to express probability is as a ratio in fraction form with the number of **possible outcomes** in the denominator, and the number of ways for a **favorable outcome** to occur in the numerator.

Example What is the probability that you will get an even number when you toss a die?

- There are 6 possible outcomes—the numbers 1, 2, 3, 4, 5, or 6.
- Any of 3 favorable outcomes is possible—2, 4, or 6.

$$\frac{\text{favorable outcomes}}{\text{possible outcomes}} = \frac{\text{ways to get an even number}}{\text{different numbers possible}} = \frac{3}{6} = \frac{1}{2}$$

The probability of getting an even number is $\frac{1}{2}$.

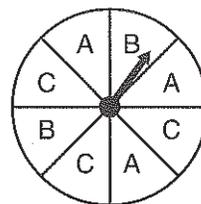


PRACTICE

Circle the correct probability.

- You buy a lottery ticket and win \$10 million.
 A impossible C not likely
 B likely D certain
- Day will follow night.
 F impossible H not likely
 G likely J certain
- You pick a number from 1–10. The number is greater than 7.
 A $\frac{2}{10}$ or $\frac{1}{5}$ C $\frac{3}{10}$
 B $\frac{4}{10}$ or $\frac{2}{5}$ D $\frac{5}{10}$ or $\frac{1}{2}$
- A person is *not* born in a month that begins with the letter *J*.
 F $\frac{1}{12}$ H $\frac{3}{12}$ or $\frac{1}{4}$
 G $\frac{6}{12}$ or $\frac{1}{2}$ J $\frac{9}{12}$ or $\frac{3}{4}$

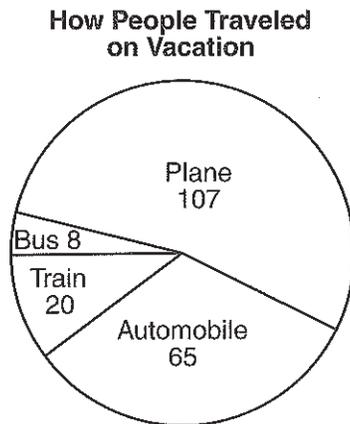
Use the spinner for Numbers 5 and 6.



- You spin the spinner. What is the probability that it will land on D?
 A impossible C not likely
 B likely D certain
- You spin the spinner. What is the probability that it will land on A?
 F $\frac{1}{8}$ H $\frac{2}{8}$ or $\frac{1}{4}$
 G $\frac{3}{8}$ J $\frac{4}{8}$ or $\frac{1}{2}$

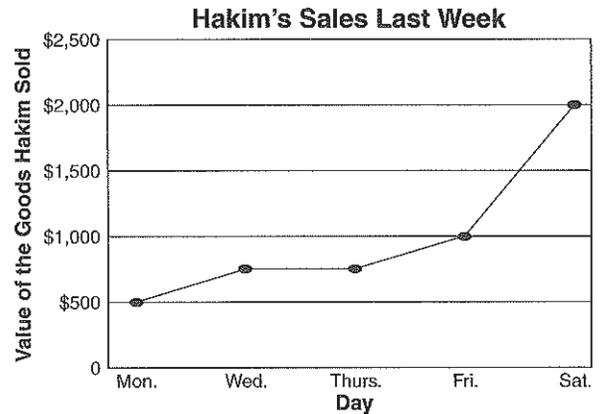
Data Interpretation Skills Checkup

This circle graph shows the form of transportation people used to travel on vacation. Use the graph to answer Questions 1–3.



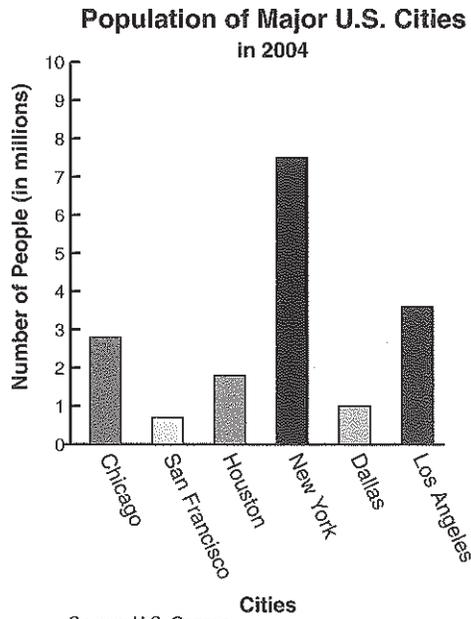
- What form of transportation did the greatest number of people in the survey use?
 A train C plane
 B automobile D bus
- Approximately how many times as many people drove as traveled by train?
 F 5 H 4
 G 3 J 2
- How did the fewest number of people travel?
 A train C plane
 B automobile D bus

Hakim sells appliances 5 days each week. Use the graph of his sales last week to answer Questions 4–6.



- What was the difference in the value of Hakim's sales on Monday and Saturday?
 F \$ 500 H \$1,000
 G \$1,500 J \$2,500
- Which is the best estimate of Hakim's average sales per day last week?
 A \$ 500 C \$ 600
 B \$1,000 D \$1,750
- Which of the following can you tell from the graph?
 F Hakim is a good salesman.
 G The value of Hakim's sales increased throughout the week.
 H Hakim works very long hours.

This graph shows the population of major cities in the United States. Study the graph and then answer Questions 7–9.

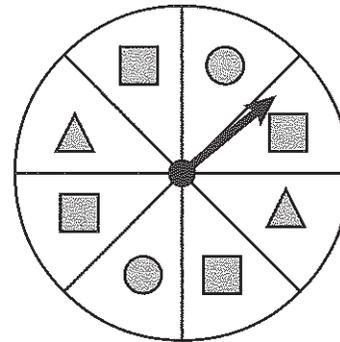


7. Which of the cities shown have a population of 1 million or fewer people?
 A Los Angeles and Dallas
 B San Francisco and Dallas
 C Houston and Dallas
 D San Francisco and Houston

8. Approximately how many more people live in Houston than in Dallas?
 F 0.2 million H 0.6 million
 G 1 million J 2 million

9. What is the median population of the cities shown?
 A 2.3 million C 2.6 million
 B 2.8 million D 2.9 million

Use the spinner shown below to answer Questions 10–13. Circle the letter that best describes the probability described when the spinner is spun.



10. The spinner will land on a square instead of a circle.
 F impossible H equally likely
 G more likely J certain

11. The spinner will land on a star.
 A impossible C equally likely
 B more likely D certain

12. The spinner will land on a circle.
 F $\frac{1}{3}$ H $\frac{1}{2}$
 G $\frac{2}{3}$ J $\frac{1}{4}$

13. The spinner will land on a square.
 A $\frac{1}{4}$ C $\frac{1}{8}$
 B $\frac{1}{2}$ D $\frac{1}{3}$

Data Analysis

Pages 96–97

1. D
2. G
3. C
4. F
5. \$2
6. \$6.50
7. \$5.25
8. regular video for 1 day
9. new release
10. \$5
11. new releases
12. \$13
13. C

Page 98

1. Linda
2. David
3. 5 years
4. Anne
5. Myumi
6. 15 years
7. Tubman
8. Roosevelt
9. 2 times

Page 99

1. \$1.60
2. \$11.40
3. \$2.90
4. \$4.10
5. \$6.50
6. \$9.70
7. 6
8. 75¢

Page 101

Median	Mode	Mean
2.5	2	3
4	none	4
2	2	2
6	5, 6	6

2. median 3, mode 2
3. median 23, mode 23
4. median 65, mode 78
5. median \$12.25, mode \$12
6. 40
7. 5 miles
8. \$75
9. 9

Page 103

1. C
2. G
3. D
4. J
5. D
6. F
7. A
8. G

Page 104

1. students
2. unemployed
3. 4,000
4. 12,000
5. C
6. H
7. C
8. G

Page 105

1. 3.0
2. 4.0
3. increase
4. 1 grade level
5. Student B
6. Student E
7. Students A and D
8. Student C

Page 106

1. 5 minutes
2. May 10 and 11
3. 5 minutes
4. May 16
5. 5 minutes
6. C
7. G
8. Yes. There is a continuing rise.

Page 107

1. C
2. J
3. C
4. J
5. A
6. G

Data Analysis Skills Checkup

Pages 108–109

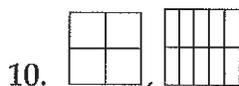
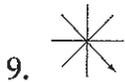
1. C
2. G
3. D
4. G

5. B
6. G
7. B
8. G
9. A
10. G
11. A
12. J
13. B

Algebra

Pages 110–111

1. C
2. G
3. C
4. F
5. B
6. 2 circles, 1 bar, 1 X
7. A



Page 112

1. 7, 4, 1
2. 21, 27, 33
3. 18, 23, 28
4. 16, 32, 64
5. 15, 31, 63

6. 176; 527; 1,580
7. 4
8. 11
9. 3
10. 3
11. plus 7
12. plus 15
13. minus 5
14. minus 6
15. 18
16. 35, 20
17. 8
18. 16
19. 7

Page 113

1. +
2. -
3. \times
4. +
5. +
6. -
7. \div
8. \div
9. +
10. -
11. \div
12. \times
13. 4
14. 8
15. 10
16. 12
17. 4
18. 9
19. 12
20. 22
21. 2

22. 10
23. 12
24. 3

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1. \div
2. -
3. +
4. 520
5. 0
6. 1
7. y
8. T
9. F
10. T
11. T
12. T
13. F
14. T

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1. In 55; Out 15, 75
2. In 3; Out 12, 300
3. In 10; Out 0, 5
4. C
5. H
6. Subtract 2.
7. Add 10.
8. Multiply by 5.
9. Add 12.
10. Divide by 4.

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1. D
2. F
3. C