

2-1

Frequency Tables (pages 50–53)

When you use **statistics**, you collect, organize, analyze, and present data, often as a **frequency table**.

Choosing a Scale for a Frequency Table	Choose a scale that includes the least and the greatest number. <ul style="list-style-type: none"> Choose an interval that will give you a manageable number of groups, usually from four to seven. Make sure all the intervals, or groups, are equal and they do not overlap.
Making a Frequency Table	<ul style="list-style-type: none"> Draw a table with three columns and tally the responses. In the third column, write the number of tallies (or frequency).

EXAMPLES

A Name the scale and the interval in this first column of a frequency table:

Free Throws

- 16–20
- 11–15
- 6–10
- 1–5

The scale goes from 1 to 20. Each interval has 5 scores in it (for example, 16, 17, 18, 19, 20). The interval is 5.

B Here are the number of free throws made by the third period gym class: 17, 2, 10, 4, 5, 7, 7, 16, 3, 12, 9, 3, 4. Complete the frequency table started in Example A.

Add two columns to the table. Mark tallies for each interval. Then write the frequencies.

Free Throws	Tally	Frequency
16–20		2
11–15		1
6–10		4
1–5		6

Try These Together

- Choose a scale for data from 3 to 32.
HINT: Your scale must include 3 and 32.
- How many different whole number scores are possible in an interval from 25 to 30?
HINT: Write each score, 25, 26, ... and count how many, or subtract 30 – 25 and add 1.

3. Entertainment Mr. Juarez awarded two points to each student answering the daily bonus question correctly. The data at the right lists the total number of points each student earned for the week. Make a frequency table for the data.

4	10	8	8	6	10
4	8	10	10	8	6
6	4	4	8	8	10
6	10	10	4	8	6

4. Standardized Test Practice What interval would you use in making a frequency table for this set of data?

2, 4, 3, 2, 10, 12, 8, 7, 5, 11

- A** 20 **B** 10 **C** 5 **D** 2

Answers: 1. Sample answer: 0–40 2. 6 3. See Answer Key. 4. D

2-2

Bar Graphs and Line Graphs (pages 56–59)

A graph represents data visually. A **bar graph** compares frequencies.
 A **line graph** compares changes over time.

Drawing a Vertical Bar Graph	Draw and label the horizontal and vertical axes. Title your graph. <ul style="list-style-type: none"> • Choose a scale and interval for the data and mark equal spaces on the vertical axis. • Mark equal spaces on the horizontal axis and label the categories. • Draw a bar for each category. The height shows the frequency.
Drawing a Line Graph	Draw and label the horizontal and vertical axes. Title your graph. <ul style="list-style-type: none"> • Choose a scale and interval for the data and mark equal spaces on the vertical axis. • Mark equal spaces on the horizontal axis and label the categories. • Draw a dot to show the frequency for each category. Draw line segments to connect the dots.

EXAMPLES

A A class collects this data.

Favorite Flavor	Frequency
vanilla	13
strawberry	4
chocolate	10
lemon	2

Determine a scale for this data.
The data go from 2 to 13. You might choose a scale from 0 to 15.

B For the data in Example A, what would be a good interval?

You could use an interval of 2 or 4.

What are the labels for the categories on the horizontal axis?

Vanilla, Strawberry, Chocolate, Lemon

What is the label for the vertical axis? for the horizontal axis? for the graph?

People; Flavors; Favorite Flavors

Try This Together

1. Make a bar graph for the data in Example A.
HINT: You will have four bars. The tallest bar shows the most popular flavor.

PRACTICE

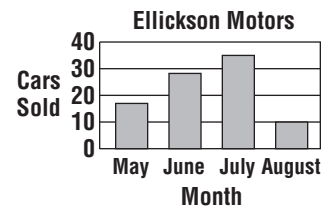
2. Make a line graph for the following set of data?

Year	1997	1998	1999	2000
Number of Students in Drama Club	3	9	17	15



3. **Standardized Test Practice** Estimate how many cars were sold in July.

- A** 15 **B** 35 **C** 25 **D** 10



Answers: 1. See Answer Key. 2. See Answer Key. 3. B

2-3

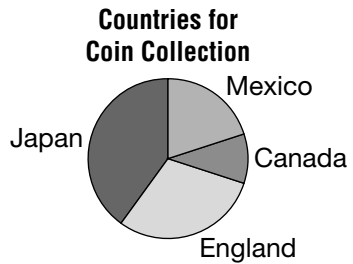
Circle Graphs (pages 62–65)

A **circle graph** compares parts of a whole. The circle is the whole and the pie-shaped sections show the parts. All the percents in a circle graph add to 100%.

Reading a Circle Graph	Read the title of the graph and the titles of all the sections. <ul style="list-style-type: none"> • Recall that half of a circle is 50% and one-fourth is 25%. • See how the percents match the sizes of the sections.
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EXAMPLES

A The circle graph shows where the coins in Joel’s collection come from. The percents are 10%, 20%, 30%, and 40%. Match each percent with the appropriate section of the graph.



The section for Japan is the largest. It is almost one-half. So 40% of his coins come from Japan. The smallest section is Canada. So 10% of his coins come from Canada. The England section is larger than the Mexico one. So 30% come from England and 20% from Mexico.

B What percent of his coins come from England and Mexico together?

Add the percents: 30% added to 20% is 50%.

Try These Together

1. What fraction of Joel’s collection comes from Canada and Japan together?

HINT: What part of the circle are these two together?

2. Canada and what other country together equal the same percent as Japan?

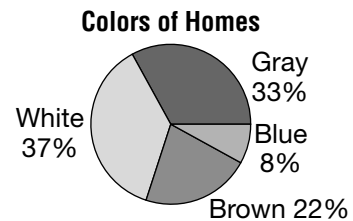
HINT: Subtract the percent for Canada from that of Japan.

PRACTICE

The circle graph shows the colors of homes in Anissa’s neighborhood.

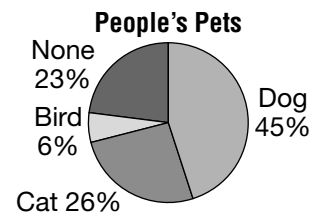
3. What percent of homes are blue?

4. What are the two most popular colors for homes in Anissa’s neighborhood?



5. Standardized Test Practice The circle graph shows the pets students have. What percent of students do not have pets?

- A** 6%
- B** 26%
- C** 23%
- D** 45%



Answers: 1. $\frac{1}{2}$ 2. England 3. 8% 4. white and gray 5. C

2-4

Making Predictions (pages 66–69)

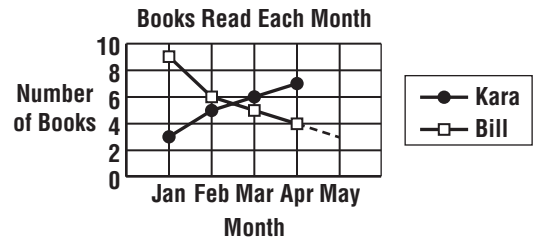
You can use a line graph to help you make predictions.

Predicting with a Line Graph

- To make a prediction with a line graph,
- Extend the graph with a dashed line.
 - From the point on the dashed line that shows where you want to make your prediction, draw a horizontal line to the left to meet the vertical axis.
 - Read the value on the vertical axis.

EXAMPLES

The graph at the right shows how many books Kara and Bill read each month.



A What is the difference in April between the number of books Kara and Bill read?

Kara read 7 and Bill read 4, so the difference is 3.

B Predict how many books Bill will read in May.

The extended line has a value on the vertical axis of 3 books.

Try These Together

1. Use the graph above to predict how many books Kara will read in May.

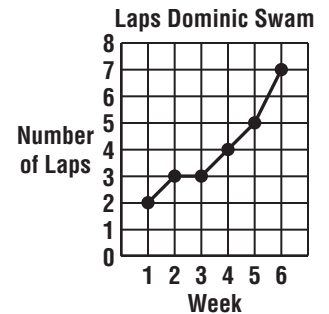
HINT: Extend the line for Kara.

2. How many more books would you expect Kara to read than Bill in May?

HINT: Use your predictions for Kara and Bill.

PRACTICE

3. **Sports** The line graph shows how many laps Dominic swam each week for 6 weeks.



a. Predict how many laps he will be able to swim in Week 7.

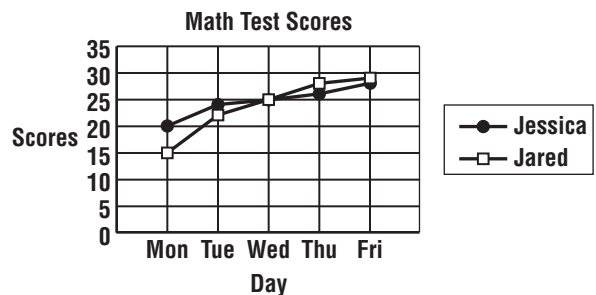
b. How many more laps did he swim in Week 4 than in Week 1?

c. Would you predict that Dominic will be able to swim more than 10 laps in Week 8?



4. **Standardized Test Practice** This line graph shows Jessica and Jared's math test scores for one week. Which day did they have the same score?

- A** Monday **B** Tuesday
C Wednesday **D** Friday



Answers: 1. 8 2. 5 3a. 9 3b. 2 3c. yes 4. C

2-5

Stem-and-Leaf Plots (pages 72–75)

You can make a large data set easier to read with a **stem-and-leaf plot**. The **stems** are the tens digits. The **leaves** are the units digits.

Drawing a Stem-and-Leaf Plot	<p>Find the digits in the tens place for the least and the greatest numbers.</p> <ul style="list-style-type: none"> • Draw a vertical line and write the tens digits in order for the stems. • Write the units digits, or leaves, to the right of their stems. • Arrange the leaves in order from least to greatest. Include a key.
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EXAMPLE

Make a stem-and-leaf plot of this data that shows how many students are in each sixth grade class.

15, 34, 20, 31, 17, 26, 24, 29, 26, 31

The stems are 1, 2, and 3.

Stem	Leaf
1	5 7
2	0 4 6 6 9
3	1 1 4

Try These Together

<p>1. How many classes are there in the data set in the Example? <i>HINT: Count the numbers in the data set.</i></p>	<p>2. What interval contains half of the class sizes? <i>HINT: Which stem has the most leaves?</i></p>
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PRACTICE

Determine the stems for each set of data.

- 13, 8, 12, 44, 26, 33, 15
- 25, 64, 35, 22, 68, 71, 84, 14, 56, 41

Make a stem-and-leaf plot for each set of data.

- 2, 5, 16, 22, 15, 14
- 24, 25, 38, 34, 46, 58
- Aviation** Adrian’s mother is an airline pilot. One week, he counted the number of hours she flew each day. Make a stem and leaf plot of the data.
12, 8, 2, 6, 10, 5



8. **Standardized Test Practice** This stem-and-leaf plot shows how many times Dara’s classmates log on to the Internet each week. In which interval do most of the times fall?

Stem	Leaf
0	1 3 3 5 8
1	2 4 4 5 6 6 7 8
2	1 1 4

- | | |
|----------------------|----------------------|
| A 12–18 times | B 21–24 times |
| C 1–8 times | D 0–10 times |

Answers: 1. 10 2. 20–29 3. 0, 1, 2, 3, 4 4. 1, 2, 3, 4, 5, 6, 7, 8 5–7. See Answer Key. 8. A

2-6

Mean (pages 76–78)

One number used to represent an entire set of data is called a **measure of central tendency**. One of the most common measures of central tendency is the **mean**. The mean is also called the average.

Finding the Mean	Add to find the sum of the data. Divide by the number of pieces of data.
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EXAMPLE

Find the mean of this set of data.

10, 13, 6, 7, 14, 28, 34, 5, 22, 11

The sum of the data is 150. There are 10 pieces of data. Divide 150 by 10 to get a mean of 15.

Try This Together

1. The heights of students in Mr. Cohen’s class are shown. Find the mean height.

HINT: Find the sum, then divide.

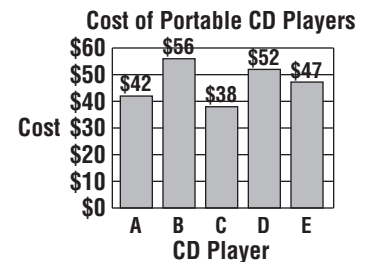
Height (in.)				
58	55	50	64	53
62	66	54	57	62
60	55	59	65	64
56	53	62	57	68

PRACTICE

Find the mean for each set of data.

2. 10, 14, 18, 23, 10 3. 36, 24, 21, 58, 21 4. 22, 23, 29, 28, 24, 24
 5. 11, 2, 4, 9, 4 6. 34, 46, 37 7. 9, 7, 3, 8, 2, 7

8. **Money Matters** Alicia is saving money for a portable CD player. The graph shows the costs of different CD players. What is the mean cost of the CD players?



9. **Standardized Test Practice** What is the mean of the set of data in the table?

- A** 54 **B** 62
C 58 **D** 67

School	Number of Students on Sports Teams
Blake	56
Irondale	68
River Trail	101
Jefferson	43

Answers: 1. 59 in. 2. 15 3. 32 4. 25 5. 6 6. 39 7. 6 8. \$47 9. D

2-7

Median, Mode, and Range (pages 80–83)

You have already learned that the mean is one type of measure of central tendency. Other types are the **median**, the **mode**, and the **range**. The mean, median, and mode of a data set describe the center of a set of data. The range of a set of data describes how much the data vary.

Finding the Median	Arrange the data in order from least to greatest. Find the middle number (or the mean of the two middle numbers).
Finding the Mode	Look for the number that appears most often. There may be more than one mode, or no mode.
Finding the Range	Subtract the least number in the data set from the greatest number in the data set.

EXAMPLE

The table shows the cost of 12 different DVDs.

Find the median, mode, and range for the set of data.

To find the median, order the data from least to greatest.

14, 15, 16, 17, 19, 19, 19, 20, 22, 22, 24, 24

Since there are two middle numbers, 19 and 19, find the mean of these numbers.

$19 + 19 = 38$, $38 \div 2 = 19$ The median is 19.

To find the mode, find the number or numbers that occur most often.

The only number that occurs three times is 19. The mode is 19.

To find the range, subtract the least value from the greatest value.

The greatest value is 24. The least value is 14. So, the range is $24 - 14$, or 10.

DVD Costs (\$)			
16	19	24	22
19	14	20	19
22	24	15	17

PRACTICE

Find the mean, median, mode, and range for each set of data.

- | | | |
|---------------------------|-----------------------|------------------------|
| 1. 57, 51, 48, 63, 51 | 2. 86, 75, 88 | 3. 9, 18, 9, 17, 9, 10 |
| 4. 22, 19, 31, 28 | 5. 36, 35, 42, 35, 42 | 6. 2, 11, 6, 1 |
| 7. 66, 59, 75, 72, 65, 59 | 8. 2, 9, 1, 1, 2 | 9. 97, 54, 89 |



10. Standardized Test Practice Which measure of central tendency may not apply to a set of data?

A mean

B median

C mode

D range

Answers: 1. 54; 51; 15 2. 83; 86; no mode; 13 3. 12; 9.5; 9; 9 4. 25; 25; no mode; 12 5. 38; 36; 35 and 42; 7 6. 5; 4; no mode; 10 7. 66; 65.5; 59; 16 8. 3; 2; 1 and 2; 8 9. 80; 89; no mode; 43 10. C

2-8

Analyzing Graphs (pages 86–89)

Graphs are sometimes drawn to influence conclusions by misrepresenting the data.

<p>Determining when a Graph is Misleading</p>	<ul style="list-style-type: none"> • Is there is a label on both scales and a title on the graph? • Does the scale start at zero? • The mean is best to represent data that are grouped closely together. • The median is best for widely scattered data. • The mode is best for data that have several repeated data values.
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EXAMPLES

A What measure of central tendency would best represent the ages of people in your math class? *Many of the ages will be repeated. The mode is best.*

B What measure would best represent the annual salaries in a large company? *The salaries are widely scattered. Choose the median.*

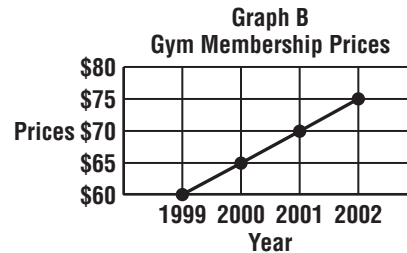
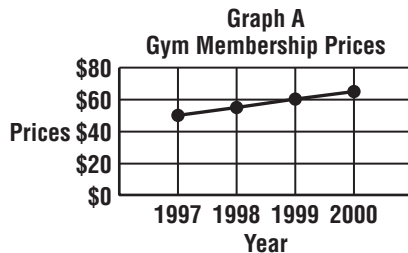
Try These Together

1. What measure best represents the distance each student lives from school?
HINT: Are the data values fairly close together?

2. Is the mode for a set of data always one of the data values?
HINT: Remember the definition of mode.

PRACTICE

Fitness *The graphs display the same data for prices at the Fitness Center.*



3. If someone were trying to sell memberships by saying that it will cost a lot more in the future, which graph might be used?
4. Why is graph B misleading?



5. **Standardized Test Practice** The results of a class survey on the number of hours each student spends on homework every night are shown in the table. What is the mode for this set of data?

- A** 1 **B** 2 **C** 4 **D** 8

Number of Hours	Frequency
1	4
2	8
3	2
4	3

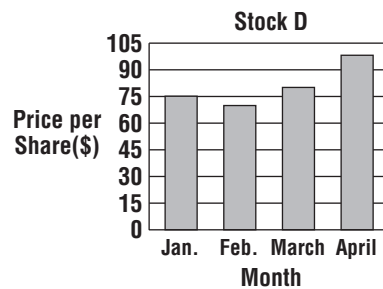
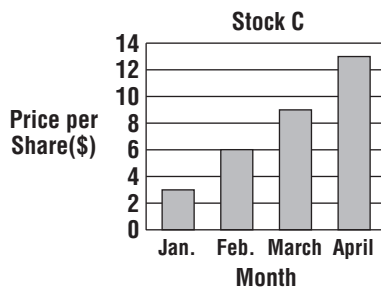
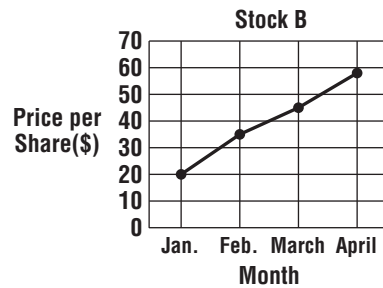
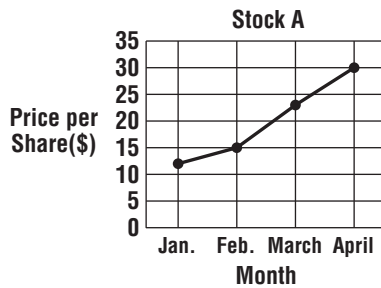
Answers: 1. mean 2. yes 3. Graph B 4. It does not show \$0 with a break in the vertical axis between \$0 and \$60. 5. B

2

Chapter 2 Review

Stock Market Game

In a stock market game, teams of students must pick a stock to “buy.” After several months, the team whose stock gains the most value wins. Teams make their decisions about which stocks to buy based on the price of the stock over the past several months. Use the information below to help your team pick the best stock.



1. Read the graphs above. By about how much did the value of each stock increase from January to April?
2. To win the stock market game, you want to buy the stock that will increase in value the most over the next several months. Based on the amount that each stock has increased in value, which stock would you want your team to buy? Explain.

Answers are located on p. 105.