

MAIN IDEA

Find the mean of a data set.

New Vocabulary

average
mean
outlier

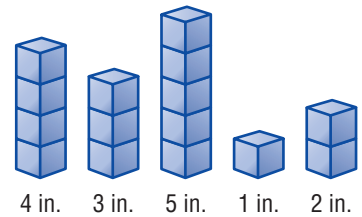
Math Online

glencoe.com

- Extra Examples
- Personal Tutor
- Self-Check Quiz

▶ MINI Lab

In five days, it snowed 4 inches, 3 inches, 5 inches, 1 inch, and 2 inches.



- Make a stack of centimeter cubes to represent the snowfall for each day, as shown at the right.
 - Move the cubes until each stack has the same number of cubes.
1. On average, how many inches did it snow per day in five days? Explain your reasoning.
 2. Suppose on the sixth day it snowed 9 inches. If you moved the cubes again, how many cubes would be in each stack?

When analyzing data, it is helpful to use a single number to describe the whole set. In the Mini Lab above, a good choice would be the number 3, the mean or **average** number of cubes in each stack that results from equally distributing all the cubes. The mean can be interpreted as a balancing point for a set of data. The mean of a set of data can also be calculated.

Mean

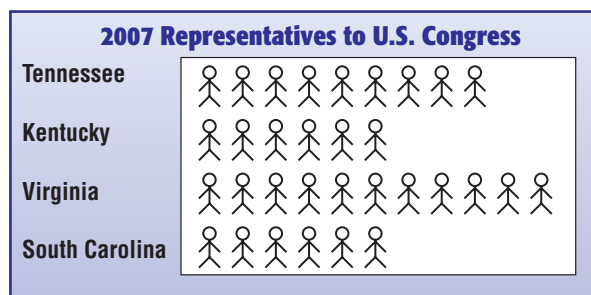
Key Concept

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

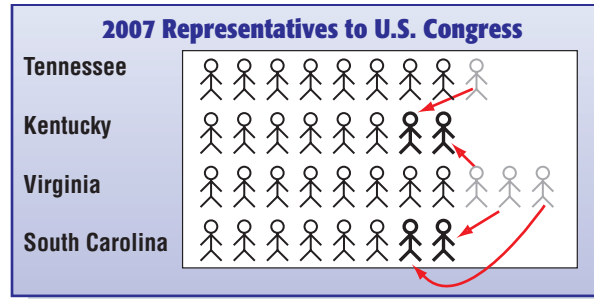
Example Data set: 4, 3, 5, 1, 2 → mean: $\frac{4 + 3 + 5 + 1 + 2}{5} = \frac{15}{5}$ or 3

EXAMPLE Find the Mean

- 1 **CIVICS** Find the mean number of Representatives for the four states shown in the pictograph.



METHOD 1 Move the figures.



Move the figures to equally distribute the total number of Representatives among the four states.

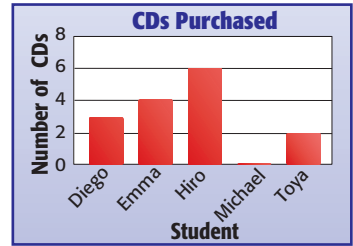
METHOD 2 Write and simplify an expression.

$$\begin{aligned} \text{mean} &= \frac{9 + 6 + 11 + 6}{4} && \leftarrow \text{sum of the data} \\ & && \leftarrow \text{number of data items} \\ &= \frac{32}{4} \text{ or } 8 && \text{Simplify.} \end{aligned}$$

Study Tip
Including Data Even if a data value is 0, it still should be counted in the total number of pieces of data.

CHOOSE Your Method

a. **MUSIC** The bar graph shows the number of CDs bought by a group of friends. Find the mean number of CDs bought by the group.



Values that are much higher or lower than others in a data set are **outliers**.

EXAMPLE Determine How Outliers Affect Mean

2 CELL PHONES The number of minutes Mary Anne spent talking on her cell phone each month for the past five months were 494, 502, 486, 690, and 478. Identify the outlier(s) in the data. Find the mean with and without the outlier. Then describe how the outlier affects the mean.

Compared to the other values, 690 is extremely high. So, it is an outlier. Find the mean with and without the outlier.

with outlier

$$\begin{aligned} &\frac{494 + 502 + 486 + 690 + 478}{5} \\ &= \frac{2,650}{5} \text{ or } 530 \end{aligned}$$

without outlier

$$\begin{aligned} &\frac{494 + 502 + 486 + 478}{4} \\ &= \frac{1,960}{4} \text{ or } 490 \end{aligned}$$

With the outlier, the mean is greater than all but one of the data values. Without it, the mean better represents the data.

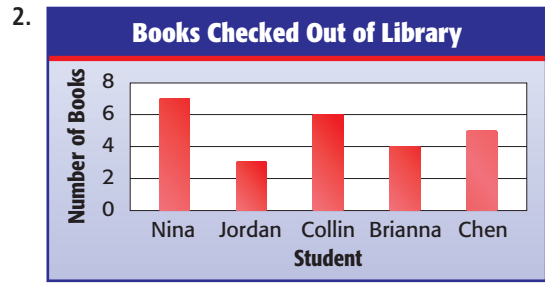
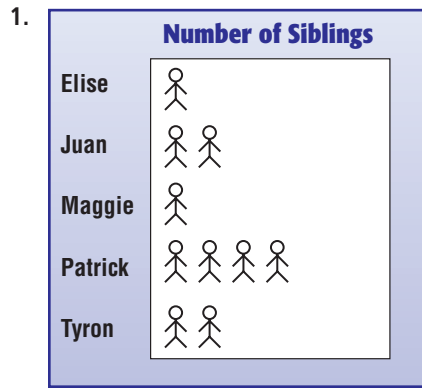
CHECK Your Progress

b. Identify the outlier in these costs: \$110, \$120, \$110, \$135, \$140, \$120, \$105, and \$440. Describe how it affects the mean.

✓ CHECK Your Understanding

Example 1
(pp. 102, 103)

Find the mean of the data represented in each model.



Example 2
(p. 103)

GEOGRAPHY For Exercises 3–5, use the table at the right. It lists the greatest depths of the oceans.

Ocean	Depth (ft)
Pacific	15,215
Atlantic	12,881
Indian	13,002
Arctic	3,953
Southern	14,749

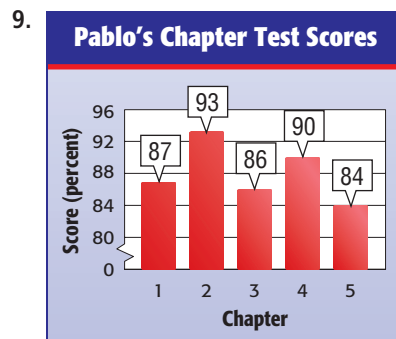
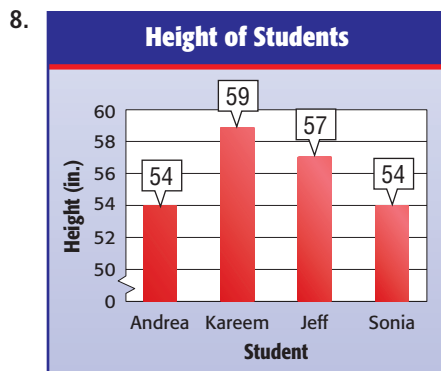
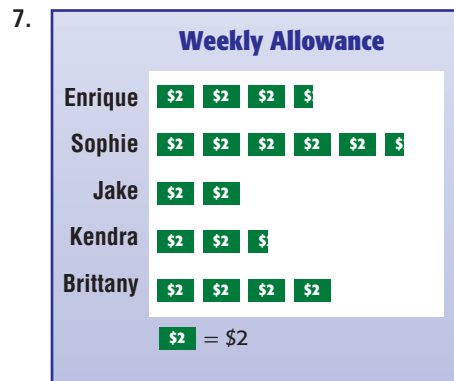
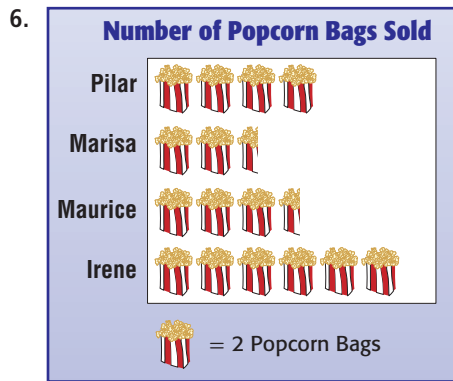
- What is the mean of the data?
- Which depth is an outlier? Explain.
- How does this outlier affect the mean?

Source: Enchanted Learning

▶ Practice and Problem Solving

HOMEWORK HELP	
For Exercises	See Examples
6–9	1
10–16	2

Find the mean of the data represented in each model.



NATURE For Exercises 10–13, use the table that shows the approximate heights of some of the tallest U.S. trees.

Tallest Trees in U.S.	
Tree	Height (ft)
Western Red Cedar	160
Coast Redwood	320
Monterey Cypress	100
California Laurel	110
Sitka Spruce	200
Port-Orford-Cedar	220

Source: *The World Almanac*

- Find the mean of the data.
- Identify the outlier(s).
- Find the mean if the outlier(s) is not included in the data set.
- How does the outlier affect the mean of the data?

MONEY For Exercises 14–16, use the following information.

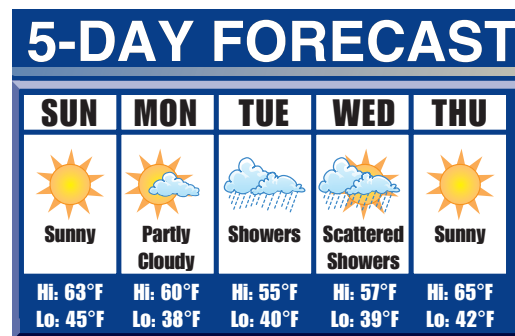
Jamila earned \$15, \$20, \$10, \$12, \$20, \$16, \$80, \$18, and \$25 baby-sitting.

- What is the mean of the amounts she earned?
- Identify the outlier(s).
- How does the outlier(s) affect the mean of the data?

Find the mean for each set of data. Explain the method you used.

- Number of songs on an MP3 player: 145, 87, 150, 122, 96
- Money saved each month: \$28, \$30, \$32, \$21, \$29, \$28, \$28
- Age of camp counselors (in years): 13, 17, 14, 16, 16, 14, 16, 14
- Number of votes received: 70, 35, 64, 98, 42

- WEATHER** The graphic at the right shows the 5-day forecast as shown on the local news. What is the difference between the mean high and mean low temperature for this 5-day period? Justify your answer.



EXTRA PRACTICE

See pages 676, 707.

H.O.T. Problems

- REASONING** Tell whether the following statement is *sometimes*, *always*, or *never* true. Justify your answer.

The mean of a set of data is one of the values in the data set.

- SELECT A TOOL** The number of people dining at a certain restaurant for several days was 319, 127, 244, 398, 427, and 261. Which of the following tools might you use to find the mean of the data? Justify your selection. Then use the tool to solve the problem.

draw a model

calculator

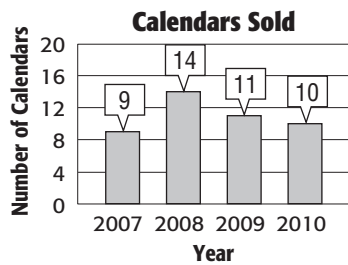
real objects

- CHALLENGE** Find a value for n such that the mean of the ages 40, 45, 48, n , 42, and 41 is 45. Explain the method or strategy you used.

25. **OPEN ENDED** Create a set of data that has five values and a mean of 34.
26. **WRITING IN MATH** The mean amount of precipitation from January to June for a certain city was about 4 inches per month. Without doing any calculations, determine how the mean would be affected if the total precipitation for the month of July for this city is 3 inches, 5 inches, or 4 inches. Explain your reasoning.

TEST PRACTICE

27. Student Council sells school calendars each year as a fundraiser. David was on Student Council from 2007 to 2010. The bar graph shows the number of calendars he sold each year.



What is the mean number of calendars David sold each year?

- A 9 C 11
B 10 D 14

28. The table shows the money raised by each booth at a craft sale.

Northside Craft Sale	
Booth	Money Raised (\$)
Artwork	58
Candles	47
Holiday decorations	54
Jewelry	70
Picture frames	45
T-shirts	80

What was the mean amount raised at each booth?

- F \$59 H \$61
G \$60 J \$62

Spiral Review

29. **BASEBALL** The table shows the number of players on each team in a baseball league. Make a line plot of the data. (Lesson 2-5)

Players Per Team					
16	15	16	15	18	19
12	15	16	14	18	14

30. **CARS** The average number of miles per gallon of gasoline for selected cars is shown in the stem-and-leaf plot. Into what interval(s) do most of the data lie? (Lesson 2-4)

Average Gas Mileage

Stem	Leaf
1	9
2	2 4 4 6 7 8
3	0 1 2 4 5 6 7 7
4	1

31. **CARPETING** How many square feet of carpeting are needed to cover a room that is 11 feet by 16 feet? (Lesson 1-9)

$1|9 = 19$ miles per gallon

▶ GET READY for the Next Lesson

PREREQUISITE SKILL Subtract. (Page 743)

32. $75 - 64$

33. $102 - 39$

34. $571 - 218$

35. $1,206 - 809$