

GET READY to Learn

Four friends set up lemonade stands in four different locations throughout their neighborhood. The table shows how much money each friend collected. The mean amount earned was \$6.

| | |
|----------|-----|
| Carter | \$4 |
| Kasha | \$7 |
| Madeline | \$9 |
| Thomas | \$4 |

MAIN IDEA

I will use the mean to describe a set of data.

4.01 d) Explore the mean as a measure of center and its interpretation as a fair share.

New Vocabulary

measures of center

macmillanmh.com

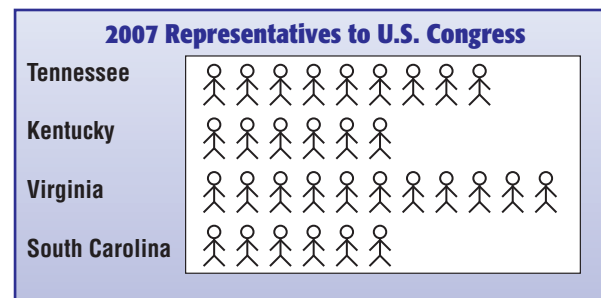
- Extra Examples
- Personal Tutor
- Self-Check Quiz

In Lesson 7-1, you learned how to find the mean, median, and mode of a data set. These three measures are called **measures of center** because they describe the *center* of a data set. The mean is also called the average because it represents the average value of a data set if each data value is distributed *equally*. Because the mean is the sum of the data values divided by the number of pieces of data, the mean represents a fair share of the data values.

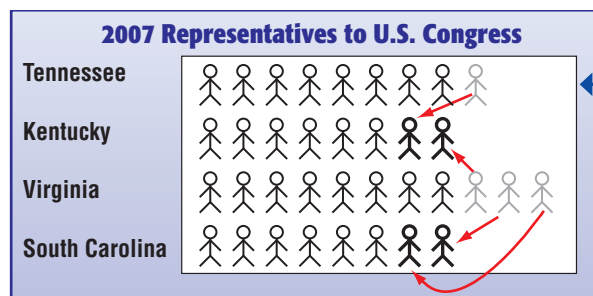
You can find the mean of data represented in a graph to give a fair measure of center of the data.

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.

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

Each state has a mean or average of 8 representatives.

EXAMPLE Distribute Data Fairly

- 2** Sabrina collected 12 pieces of candy from a piñata. Meagan collected 15 pieces of candy, and Kim collected 18 pieces of candy. The three friends decided to combine their candy and split it evenly among them so that they each had a fair share. How many pieces of candy will each girl receive?

To find the amount candy each girl will receive, find the mean of the data.

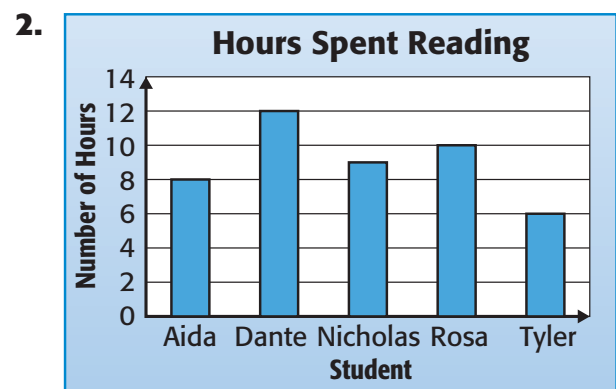
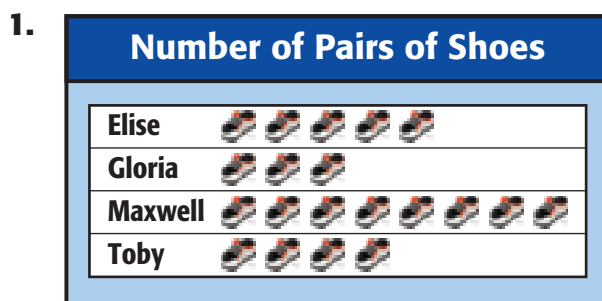
$$12 + 15 + 18 = 45 \quad \text{Find the sum of the data.}$$

$$45 \div 3 = 15 \quad \text{Divide by the number of girls.}$$

So, each girl will receive 15 pieces of candy.


CHECK What You Know

Find the mean of the data represented in each model. See Example 1 (p. 696)

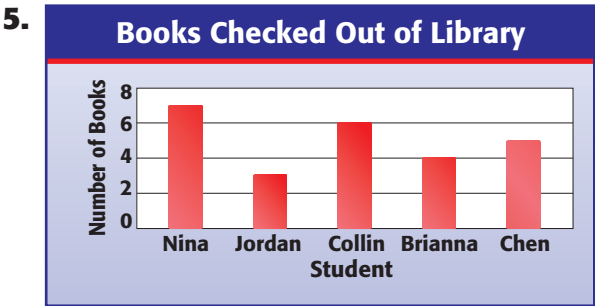
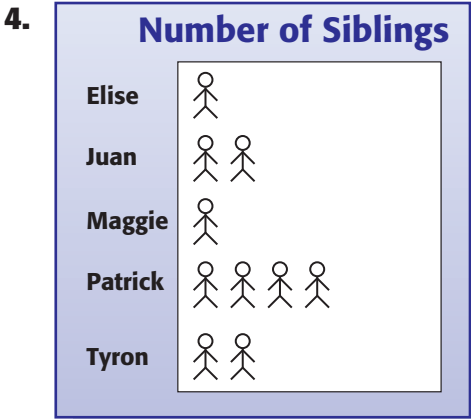


- 3.** The table shows the number of points each of five friends received while playing games at an arcade. The points can be redeemed for prizes. The friends decided to combine the points and then split them equally amongst themselves. How many points will each friend receive to use for prizes?

| Friend | Points |
|---------|--------|
| Ally | 105 |
| Brandon | 135 |
| Lucy | 170 |
| Miko | 120 |
| Ruben | 95 |

Practice and Problem Solving

Find the mean of the data represented in each model. See Example 1 (p. 696)



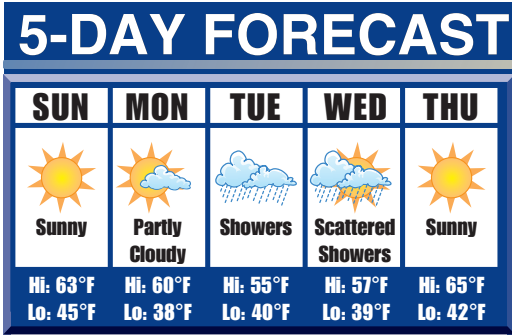
For Exercises 6–8, use the table at the right. It lists the greatest depths of the oceans. See Example 2 (p. 697)

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

Source: Enchanted Learning

- What is the mean of the data?
- Which data value is farthest away from the mean than the other data values?
- Describe how including this data value in the calculation of the mean affects the mean's interpretation as a fair share of the data.

- 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 temperatures for the 5-day period? Justify your answer.
- Refer to Exercise 3. Suppose a sixth friend, Antwon, was included. If Antwon received 155 points, how many points would each friend receive if they split the number of points equally amongst themselves?



- The table shows the amount of money Quentin earns for mowing 5 different lawns in his neighborhood. His friend asked him the average amount of money he receives for mowing a lawn. What amount should Quentin tell his friend?

| Lawn | Earnings (\$) |
|------|---------------|
| 1 | 10 |
| 2 | 18 |
| 3 | 13 |
| 4 | 15 |
| 4 | 9 |

Real-World PROBLEM SOLVING

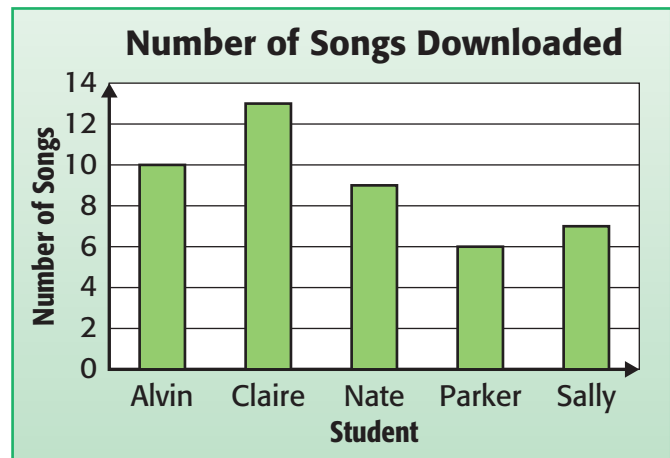
WEATHER The table at the right shows the monthly average high temperatures in Greensboro, North Carolina.

12. What temperature could describe the average high during the summer (June, July, and August) in Greensboro?
13. What temperature could describe the average high temperature during the winter months (December, January, and February)?
14. Daniel’s grandparents spend October through February in Greensboro. What is the average high temperature during these months?

| Average High Temperature, Greensboro, North Carolina | |
|--|------------------|
| Month | Temperature (°F) |
| January | 47 |
| February | 52 |
| March | 60 |
| April | 70 |
| May | 77 |
| June | 84 |
| July | 88 |
| August | 86 |
| September | 79 |
| October | 70 |
| November | 60 |
| December | 51 |

H.O.T. Problems

15. **FIND THE ERROR** The graph at the right shows the number of songs that five students downloaded from the Internet. Byron and Dimitri both found the mean of the data in the bar graph. Who is correct? Explain.



Byron

$$\frac{10 + 13 + 9 + 6 + 7}{5} = 9 \text{ songs}$$

Dimitri

$$\frac{10 + 14 + 10 + 6 + 8}{5} = 9.6 \text{ songs}$$

16. **WRITING IN MATH** The table shows the number of students in each fifth grade homeroom at Dartwell Elementary. For the school field day, the teachers want each homeroom to have the same number of students. Explain what the teachers can do so that each homeroom has a fair number of students participating in the events.

| Number of Students in Fifth Grade Homerooms | | |
|---|----|----|
| 24 | 28 | 25 |
| 27 | 26 | 26 |