

## Summarize

Be sure to discuss how to calculate the median when there is an odd number of data values and when there is an even number of data values.

### Suggested Questions

- Earlier, you found a different measure of center called the mode. How does the median compare with the mode in this data set? Is it possible that the median and mode may not be the same?
- If you had several data values, folding a strip of paper to find the position and value of the median would be inefficient. How else might you find the position and value of the median?
- What general rules can you use to find the position and value of the median when there is an odd number of data values? An even number of data values?



### Assignment Guide for Problem 1.3

Applications: 9–14 | Connections: 19–23

Extensions: 29–30

## Answers to Problem 1.3

- A. 1.** There are now 22 observations. The median is still located between 11 and 12. Its value is still  $11\frac{1}{2}$ . This is because one data value was added to either side of the midway point, keeping the data set in balance.
- 2.** There are now 23 observations. The median's position is now on the last number 11. The value of the median is 11. Adding one data value smaller than the original median shifted the midway point to the left.
- 3. a.** The position of the median does change. Of the data values added, more of them are greater than the original median; therefore, the location of the median shifts to the right.
- b.** The median is now 12 since the location of the median shifted to the right (which is a different data value).
- c.** When there are repeated values in the middle of a data set, the median might fall between two data values that are equal. In the case of the Japanese class names, the median value is 12 letters; half the class (15 people) has names with lengths 12 letters or more, and half the class (15 people) has names with lengths 12 letters or less. Eleven people have names with exactly 12 letters.
- B. 1.** Chinese: median 7 letters, range 5 letters, data vary from 4 to 9 letters; Japanese: median 12 letters, range 7 letters, data vary from 7 to 14 letters; United States: median 12.5 letters, range 8 letters, data vary from 9 to 17 letters
- 2.** Answers will vary. Possible answers: The U.S. class and the Japanese class have similar medians. The Chinese class has a smaller median, so the name lengths of the Chinese students are shorter than those of the other two classes. The range of number of letters in Chinese names is 5, so the name lengths for Chinese names are less variable (i.e., less spread out) than the other two classes.
- C. 1.** the 5th value from the top or bottom of the ordered list; the 10th value; the 500th value
- 2.** between the 5th and 6th values, counting from either the top or bottom of the ordered list; between the 10th and 11th values; between the 500th and the 501st values
- 3.** When there is an even number of data values, the median is located between the two middle data values; when there is an odd number of data values, the median takes its value from the middle data value.