Lesson 11-4

Example 1 Find Measures of Central Tendency
The ages, in years, of the people sitting in a row at a movie theater are 15, 16, 18, 12, 16, and 19. Find the mean, median, mode, and range of the set of data.

Mean $\frac{15 + 16 + 18 + 12 + 16 + 19}{6} = \frac{96}{6}$

$= 16$ The mean is 16.

Median Arrange the numbers in order from least to greatest.

12 15 $\underbrace{16 \quad 16}$ 18 19

$\frac{16 + 16}{2} = 16$ The median is 16.

Mode The data has a mode of 16.

Range 19 – 12 or 7 years

Example 2 Real-World Example
GEOGRAPHY Select the appropriate measure of central tendency or range to describe the data in the table. Justify your reasoning.

State	Population (in millions)
Alabama	4.4
California	33.9
Georgia	8.2
Maine	1.3
New York	19.0
Ohio	11.4
Vermont	0.6

Source: 2000 Census

Find the mean, median, mode, and range of the data.

Mean $\frac{4.4 + 33.9 + 8.2 + 1.3 + 19.0 + 11.4 + 0.6}{7} = \frac{78.8}{7}$

≈ 11.3

The mean is about 11.3 million.

Median Arrange the numbers from least to greatest.
0.6, 1.3, 4.4, 8.2, 11.4, 19.0, 33.9
The median is the middle number or 8.2 million.

Mode Since each number only occurs once, there is no mode.

Range 33.9 – 4.4 or 29.5 million

Since there is no mode, you must decide whether the mean, 11.3 million, or the median, 8.2 million, is more representative of the data. Notice that the extremely large population of California greatly affected the mean. The best representation of the data is the median, 8.2 million. The range tells us that the spread of the data is 29.5 million.

Example 3 STANDARDIZED TEST PRACTICE EXAMPLE
Monica has an average of 85 on 9 quizzes. If her teacher drops Monica's lowest grade, a 72, which equation can be used to find *a*, Monica's new average?

A $a = \frac{85 - 72}{8}$ **C** $a = \frac{85(9) - 72}{9}$

B $a = \frac{85(9) - 72}{8}$ **D** $a = \frac{85(9 - 72)}{8}$

Read the Test Item
You need to find the average quiz score after one grade is removed.

Solve the Test Item
Monica's average before dropping lowest score:

$$\text{average score} \rightarrow 85 = \frac{85 \times 9}{9} \begin{array}{l} \leftarrow \text{sum of } 9 \text{ quiz scores} \\ \leftarrow \text{number of quizzes} \end{array}$$

Monica's average after dropping lowest score:

$$\text{new average score} \rightarrow a = \frac{85 \times 9 - 72}{8} \begin{array}{l} \leftarrow \text{sum of } 9 \text{ quiz scores less } 72 \\ \leftarrow \text{number of quizzes less } 1 \end{array}$$

The correct answer choice is B because the sum of the scores is 72 less and there is one less score.