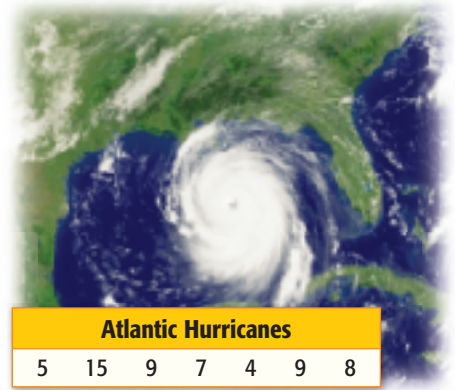


# Median, Mode, and Range



Atlantic Hurricanes

5	15	9	7	4	9	8
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Source: National Hurricane Center

## MAIN IDEA

Find and interpret the median, mode, and range of a set of data.

## New Vocabulary

measures of central tendency

median  
mode  
range

## Math Online

[glencoe.com](http://glencoe.com)

- Extra Examples
- Personal Tutor
- Self-Check Quiz

## ▶ GET READY for the Lesson

**HURRICANES** The table shows the number of Atlantic hurricanes in different years.

1. Order the data from least to greatest.  
Which piece of data is in the middle of this list?
2. Compare this number to the mean of the data.

A data set can also be described by its median or its mode. The mean, median, and mode are called **measures of central tendency** because they describe the *center* of a set of data.

## Median

### Key Concept

**Words** The **median** is the middle number of the ordered data when there are an odd number of data, or the mean of the middle two numbers when there are an even number of data.

**Examples** data set: 3, 4, **8**, 10, 12 → median: 8  
data set: 2, 4, **6, 8**, 11, 12 → median:  $\frac{6+8}{2}$  or 7

## Mode

**Words** The **mode** is the number or numbers that occur most often.

**Example** data set: 12, 23, **28, 28**, 32, **46, 46** → modes: 28 and 46

## EXAMPLE Find the Median and the Mode

**1 MONKEYS** The table shows the number of monkeys at eleven different zoos. Find the median and mode of the data.

Number of Monkeys					
28	36	18	25	12	44
18	42	34	16	30	

Order the data from least to greatest.

median: 12, 16, 18, 18, 25, **28**, 30, 34, 36, 42, 44    **28 is in the middle.**

mode: 12, 16, **18, 18**, 25, 28, 30, 34, 36, 42, 44    **18 occurs most often.**

The median is 28 monkeys. The mode is 18 monkeys.

## ✓ CHECK Your Progress

- a. **BUILDINGS** The list shows the number of stories in the 11 tallest buildings in Springfield. Find the median and mode of the data.  
40, 38, 40, 37, 33, 30, 20, 24, 21, 17, 19

## Study Tip

**Mean, Median, Mode, and 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.

The **range** of a set of data is the difference between the greatest and the least values of the set. When compared to the values in the data set, a large range indicates that the data are spread out. A small range indicates that the data are close in value.

### EXAMPLE Find the Range

- 2 **COINS** Ella collected 125, 45, 67, 150, 32, 45, and 12 pennies each day this week for a school fundraiser. Find the range of the data. Then write a sentence that describes how the data vary.

The greatest number of pennies is 150. The least number of pennies is 12. So, the range is  $150 - 12$  or 138. The range is relatively large, so the data are spread out.

### CHECK Your Progress

- b. **TESTS** Santos' science test scores this school year were 98, 83, 75, 74, 70, 82, 95, and 88. Find the range of the data. Then write a sentence describing how the data vary.

### Real-World EXAMPLE

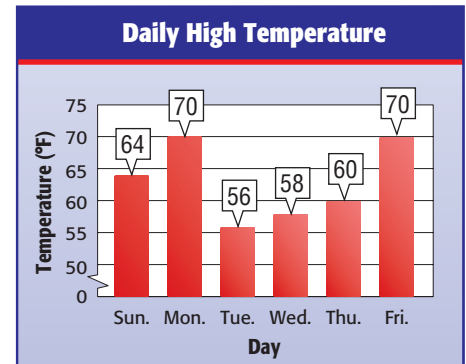
- 3 **WEATHER** Find the mean, median, mode, and range of the temperatures displayed in the graph.

$$\begin{aligned}\text{mean: } & \frac{64 + 70 + 56 + 58 + 60 + 70}{6} \\ & = \frac{378}{6} \text{ or } 63^\circ\end{aligned}$$

$$\begin{aligned}\text{median: } & 56, 58, 60, 64, 70, 70 \\ & \frac{60 + 64}{2} = \frac{124}{2} \\ & = 62^\circ\end{aligned}$$

$$\text{mode: } 70^\circ$$

$$\text{range: } 70 - 56 = 14^\circ$$



There are an even number of data values. So, to find the median, find the mean of the two middle numbers.

### CHECK Your Progress

- c. **BACKPACKS** Find the mean, median, mode, and range of the costs in the stem-and-leaf plot.

Stem	Leaf
1	5 9
2	0 4 5 9
3	2 5 8 9
4	9
5	8 9 5 8 = \$58

## TEST EXAMPLE



- 4 DESERTS** The table shows the approximate sizes of the world's largest subtropical deserts. Which statement is supported by the data?

World's Largest Deserts	
Desert	Size (square miles)
Sahara	3,500,000
Arabian	1,000,000
Great Victoria	250,000
Kalahari	220,000
Chihuahuan	175,000

- A Half of the deserts listed are larger than 220,000 square miles.
- B The most common desert size listed is 220,000 square miles.
- C The desert sizes are very spread out.
- D If the total area was divided equally among these deserts, the size of each desert would be about 850,000 square miles.

### Real-World Link . . . . .

The tallest recorded sand dune in the world is found in the Sahara Desert at 1,410 feet tall. This is just short of the height of the Sears Tower at 1,450 feet.

Source: California Association of 4 Wheel Drive Clubs

### Read the Item

The answer choices refer to the median, mode, range, and mean.

### Solve the Item

median: The middle number is 250,000.

mode: no mode

range:  $3,500,000 - 175,000 = 3,325,000$

mean: The sum of the data is 5,145,000. Dividing 5,145,000 by five data values gives 1,029,000.

Determine which measure is referred to in each answer choice.

**Choice A** refers to the median, but the correct median is 250,000.

**Choice B** refers to the mode, but there is no mode.

**Choice C** refers to the range. The data are very spread out.

**Choice D** refers to the mean, but the correct mean is 1,029,000.

The correct answer is C.

### Test-Taking Tip

**Examine Answer Choices** It is best to examine all the answer choices when determining which one best supports a given set of data or criteria.

### ✓ CHECK Your Progress

- d. **HOCKEY** The number of goals scored by each player on a high school hockey team is shown. Which statement is supported by the data in the table?

Goals Scored in Regular Season, Per Player				
3	1	2	0	4
1	5	0	3	5
4	0	2	15	0

- F If the number of goals were equally distributed among all the players, each player would have scored 3 goals.
- G Half the players scored more than 3 goals, and half scored fewer than 3 goals.
- H Most of the players scored 2 goals.
- J The range is 13 goals.

# CHECK Your Understanding

**Examples 1, 2**  
(pp. 108, 109)

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

1. Points scored by football team: 15, 20, 23, 13, 17, 21, 17
2. Monthly spending: \$46, \$62, \$63, \$57, \$50, \$42, \$56, \$40

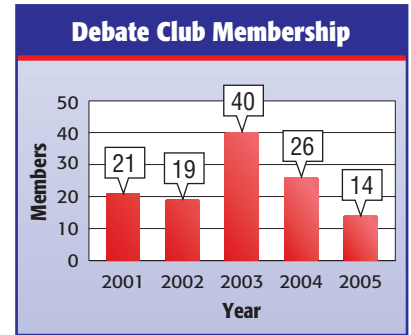
**Example 3**  
(p. 109)

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

3. **Cost of CDs (dollars)**



4.



**Example 4**  
(p. 110)

5. **MULTIPLE CHOICE** The lengths of the longest underwater car tunnels are shown. Which statement is supported by the data?

State	NY	NY	MA	NY	VA
Length (ft)	8,220	8,560	8,450	9,120	8,190

Source: *The World Almanac*

- A If the lengths of the tunnels were distributed equally among all 5 tunnels, each would measure 8,450 feet in length.
- B There is no tunnel length that occurs more often than another.
- C The lengths of the tunnels have a range of 900 feet.
- D The majority of the tunnels are greater than 8,500 feet in length.

## Practice and Problem Solving

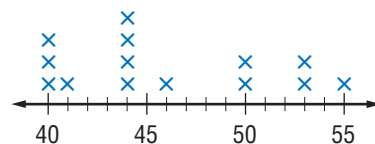
HOMEWORK HELP	
For Exercises	See Examples
6–9	1, 2
10–13	3
22, 23	4

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

6. Age of employees: 23, 22, 15, 36, 44
7. Minutes spent on homework: 18, 20, 22, 11, 19, 18, 18
8. Math test scores: 97, 85, 92, 86
9. Height of trees in feet: 23, 27, 24, 26, 26, 24, 26, 24

**ANALYZE DISPLAYS** For Exercises 10 and 11, find the mean, median, mode, and range of the data represented.

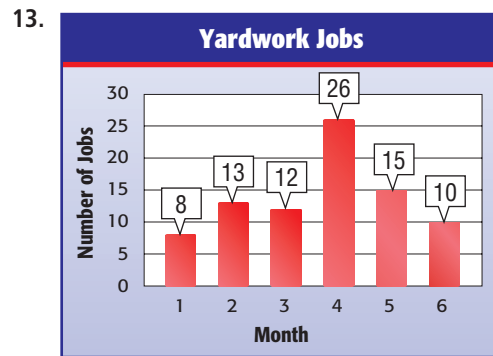
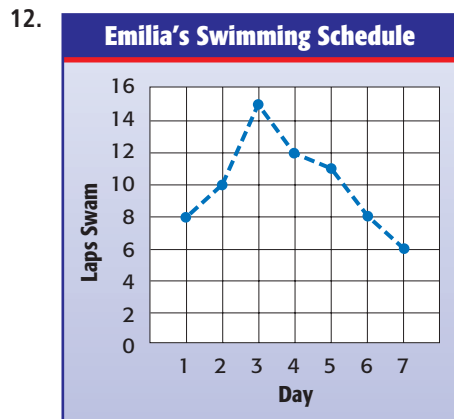
10. **Average Speeds (mph)**



11. **Test Grades**

Stem	Leaf
6	5 7
7	0 2 2 5 7
8	0 2 2 5 5 5 5 7 8
9	0 0 2 5 5 7
10	0 0 8   2 = 82%

**ANALYZE DISPLAYS** For Exercises 12 and 13, find the mean, median, mode, and range of the data represented.



14. **MUSIC** Marjorie's friends bought CDs for \$12, \$14, \$18, \$10, \$14, \$12, \$12, and \$12. Which measure, mean, median, or mode, best describes the cost of the CDs? Explain your reasoning.

15. **ANALYZE TABLES** A Louisville newspaper claims that during seven days, the high temperature in Lexington was typically  $6^{\circ}$  warmer than the high temperature in Louisville. What measure was used to make this claim? Justify your answer.

Daily High Temperatures ( $^{\circ}$ F)							
Louisville				Lexington			
75	50	80	72	80	73	75	74
70	84	70		71	76	76	

**EXTRA PRACTICE**  
See pages 677, 707.

16. **FIND THE DATA** Refer to the Data File on pages 16–19. Choose some data that is best described by its median value. Explain your reasoning.

**H.O.T. Problems**

17. **COLLECT THE DATA** Record the number of students in your math class each day for one week. Then describe the data using the mean, median, and mode.

18. **CHALLENGE** The ticket prices in a concert series were \$12, \$37, \$45, \$18, \$8, \$25, and \$18. What was the ticket price of the eighth and final concert in this series if the set of 8 prices had a mean of \$23, a mode of \$18, a median of \$19.50, and a range of \$37?

**REASONING** One evening at a local pizzeria, the following number of toppings were ordered on each large pizza.

3, 0, 1, 1, 2, 5, 4, 3, 1, 0, 0, 1, 1, 2, 2, 3, 6, 4, 3, 2, 0, 2, 1, 3

Determine whether each statement is *true* or *false*. Explain your reasoning.

- The most number of people ordered a pizza with 1 topping.
- Half the customers ordered pizzas with more than 3 toppings, and half the customers ordered pizzas with less than 3 toppings.
- WRITING IN MATH** In the data set {3, 7, 4, 2, 31, 5, 4}, which measure: mean, median, or mode, best describes the set of data? Explain your reasoning.

