Name: _____ Date: _____

Lesson 14.4 Real-World Problems: Mean, Median, and Mode

Find the mean, median, and mode.

1. The amount of honey harvested, in gallons, from a hive for 15 years is 6, 3, 6, 6, 5, 6, 7, 7, 3, 4, 7, 5, 6, 4, and 7. Find the mean, median, and mode. Round your answers to the nearest tenth of a gallon.

Use the data in the table to answer each question.

The table shows the number of windows in 50 houses.

Number of Windows in 50 Houses

Number of Windows	3	4	5	6	7	8
Number of Houses	3	6	14	15	7	5

2. Find the mean, median and, mode.

3. Which measure of central tendency best describes the data set? Justify your answer.

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Solve. Show your work.

The data set shows the number of hours students spent online shopping during one week.

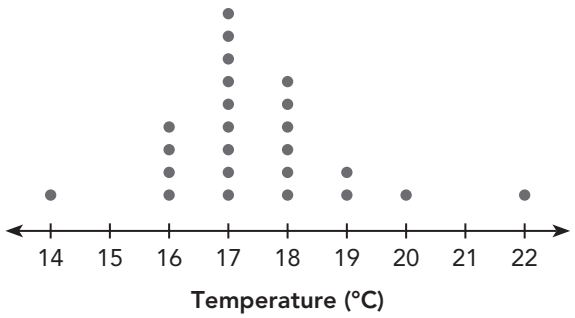
0, 0, 0, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 2, 2

4. Find the mean, median, and mode.

5. What is the least whole number you should include in the data set if you want the mean to be greater than the median?

Use the data in the dot plot to answer the question.

The dot plot shows a town's daily low temperature, in degrees Celsius, for 24 days.



6. Briefly describe the data distribution and relate the measure of center to the shape of the dot plot shown.

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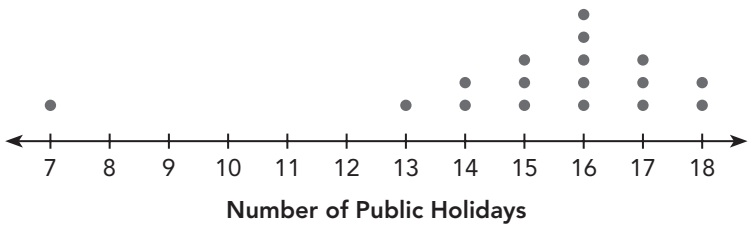
Use the data in the dot plot to answer each question.

The dot plot shows the number of public holidays in some countries. Each dot represents 1 country.



7. Find the mean, median, and mode. Round your answers to the nearest whole number.

8. Give a reason why the mean is less than the median.

9. Which measure of central tendency best describes the data set? Explain.

10. Relate the measures of center to the shape of the data distribution.

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Make a dot plot to show the data. Use your dot plot to answer each question.

The lengths of 20 leaves were correctly measured to the nearest centimeter.
The following information is known about the results.

The number of leaves that measure 2 centimeters is two times the number of leaves measuring 4 centimeters, and 8 centimeters. It is also half the number of leaves measuring 3 centimeters.

The ratio of the number of leaves measuring 5 centimeters to the number of leaves measuring 6 centimeters, to the number of leaves measuring 7 centimeters is 1 : 2 : 1.

There are 2 more leaves measuring 6 centimeters than leaves measuring 3 centimeters.

11. Make a dot plot to show the data. Give the dot plot a title.

12. Briefly describe the data distribution and relate the measure of center to the shape of the dot plot shown.

8. Mean $= \frac{6 + 3 \cdot 2 + 5 \cdot 3 + 5 \cdot 4 + 2 \cdot 5}{21} \approx 2.7$

9. The median number of countries visited is 3.

10. Median. The distribution is almost uniform. Also, the mean, 2.7 countries, is unrealistic in this context.

11. Arrange the numbers from the least to the greatest:
13, 34, 43, q, 52, 64

$$\text{Median} = \frac{q + 43}{2}$$
$$47 = \frac{q + 43}{2}$$
$$q = 51$$

The value of q is 51.

12. Arrange the numbers from the least to the greatest:
20, 22, 23, 24, 25, b, 28, 29, 30, 30, 32, 32

$$\text{Median} = \frac{b + 28}{2}$$
$$27 = \frac{b + 28}{2}$$
$$b = 26$$

The value of b is 26.

13. Arrange the numbers from least to greatest:
2, 4, 4, 5, x, 8, 9, 9, 10, y

$$\text{Median} = \frac{x + 8}{2}$$
$$7 = \frac{x + 8}{2}$$
$$x = 6$$
$$\text{Mean} = \frac{2 + 4 + 4 + 5 + 6 + 8 + 9 + 9 + 10 + y}{10}$$
$$7 = \frac{57 + y}{10}$$
$$y = 13$$

The value of x is 6, and the value of y is 13.

14. a) $x + \frac{1}{8}$

b) $x - 9\frac{1}{3}$

c) $-5.8x + 3$

d) $2x - 1$

e) x

f) x

Lesson 14.3

1. In the data set, the number 4 appears most frequently. So, the number 4 is the mode of the data set.

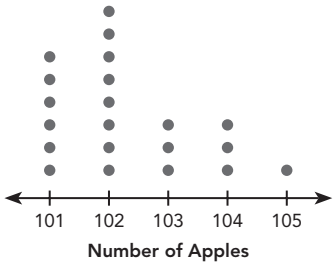
2. In the data set, the number 12 appears most frequently. So, the number 12 is the mode of the data set.

3. The modes of the data set are 7.7 and 9.3.

4. The mode of the data set is 0.

5. The mode of the data set is oranges.

6.



7. Total number of apples
$= 6 \cdot 101 + 8 \cdot 102 + 3 \cdot 103 + 3 \cdot 104 + 105$
$= 2{,}148$
$\text{Mean} = \frac{2{,}148}{21} \approx 102$

8. The median number of apples is 102.

9. The modal number of apples is 102.

10. a) The possible values of x are 7, 8, 9, and 12.

b) A possible value of x is 10. The mode is 10.

11. a) $1 + 4 + 6 + x + 8 + y + 2 = 30$
$x + y = 9$
The greatest value of x is 7, so the value of y is 2.

b) The median number of light bulbs that need to be replaced is 3.

c) Mean
$= \frac{1 \cdot 4 + 2 \cdot 6 + 3 \cdot 7 + 4 \cdot 8 + 5 \cdot 2 + 6 \cdot 2}{30}$
$= \frac{91}{30} \approx 3$

Lesson 14.4

1. First, arrange the numbers from least to greatest:
3, 3, 4, 4, 5, 5, 6, 6, 6, 6, 6, 7, 7, 7, 7
Mean
$= \frac{2 \cdot 3 + 2 \cdot 4 + 2 \cdot 5 + 5 \cdot 6 + 4 \cdot 7}{15}$
$= \frac{82}{15} \approx 5.5$
The mean mass of honey harvested is approximately 5.5 gallons.
The median mass of honey harvested is 6 gallons.
The modal mass of honey harvested is 6 gallons.

2. Mean
$= \frac{3 \cdot 3 + 4 \cdot 6 + 5 \cdot 14 + 6 \cdot 15 + 7 \cdot 7 + 8 \cdot 5}{50}$
$= \frac{282}{50} = 5.64$
The mean number of windows is 5.64 windows.
The median number of windows is 6.
The modal number of windows is 6.

3. Median and mode. The mean number of windows is 5.64. It is not a realistic number for describing the data set. The median and mode are both 6, which is a realistic number for describing the data set. So, the median and the mode best describe the data set.

4. Mean
$= \frac{1 \cdot 3 + 2 \cdot 7 + 3 \cdot 5 + 2 \cdot 2}{3 + 3 + 7 + 5 + 2}$
$= \frac{36}{20} = 1.8$
The mean number of hours is 1.8 hours.
The median number of hours is 2. The modal number of hours is 2.

5. Mean
$= \frac{1 \cdot 3 + 2 \cdot 7 + 3 \cdot 5 + 2 \cdot 2 + 7}{3 + 3 + 7 + 5 + 2 + 1}$
$= \frac{43}{21} \approx 2.05 > 2$
The least number is 7.

6. The shape of the distribution is right-skewed. So, the measure of center is likely to be 17 degrees Celsius, which is in the middle range.

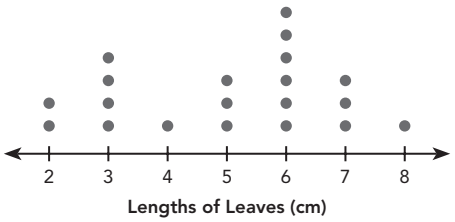
7. Mean
$= \frac{\begin{array}{l}7 + 13 + 2 \cdot 14 + 3 \cdot 15 + \\ 5 \cdot 16 + 3 \cdot 17 + 2 \cdot 18\end{array}}{1 + 1 + 2 + 3 + 5 + 3 + 2}$
$= \frac{260}{17} \approx 15$
The mean number of public holidays is approximately 15 days.
The median number of public holidays is 16.
The modal number of public holidays is 16.

8. There is an outlier, 7.

9. Median and mode. The mean number of public holidays is 15, which is affected by the outlier at 7. The median and mode is 16, which is the same. So, the median and the mode best describe the data set.

10. The data are well spread and the shape of the data distribution is nearly symmetrical with an outlier, 7. So, the measure of center is likely to be 16, which is in the upper range.

11.



12. There are two peaks in the distribution of the data—one is for length 3 centimeters, and the other is for length 6 centimeters. Most of the data is to the left of the length 6 centimeters, and the distribution is left-skewed. So, the measure of center is likely to be 5 centimeters, which is in the middle range.

Brain @ Work

1. Let the missing numbers be x and y.
Total number of members
$= 102 + 104 + 75 + 70 + x + y$
$92\frac{1}{6} \cdot 6 = x + y + 351$
$553 = x + y + 351$
$553 - 351 = x + y$
$x + y = 202$
Total number of members
$= 102 + 104 + 75 + 70 + 0.75x + y$
$87\frac{5}{6} \cdot 6 = 0.75x + y + 351$
$527 = 0.75x + y + 351$
$527 - 351 = 0.75x + y$
$0.75x + y = 176$
25% of $x = 202 - 176 = 26$
$x = 26 \cdot 4 = 104$
$y = 202 - 104 = 98$
The two missing numbers are 98 and 104.

Cumulative Practice for Chapters 12 to 14

1. c **2.** b **3.** a

4. Surface area
$= (2 \cdot 12^2) + (4 \cdot 12 \cdot 3)$
$= 288 + 144$
$= 432 \text{ in.}^2$
Volume $= 12^2 \cdot 3$
$= 432 \text{ in.}^3$

5. Surface area
$= (2 \cdot \frac{1}{2} \cdot 14 \cdot 7) + 10 \cdot (9.2 + 10.6 + 14)$
$= 98 + 338$
$= 436 \text{ cm}^2$
Volume $= \frac{1}{2} \cdot 14 \cdot 7 \cdot 10$
$= 490 \text{ cm}^3$

6. edge $= \sqrt{\frac{232}{15}} \approx 3.9 \text{ m}$