

## 11.1 Start Thinking

Using a printout from your teacher, obtain a list of your percentages on tests in your math class for the current school year. Arrange the percentages from least to greatest.

What was your lowest percentage on a test? your highest? What is the difference between the two? Which percentage did you achieve the most often (if any)? What percentage is in the middle?

## 11.1 Warm Up

Divide. Round to the nearest tenth, if necessary.

1.  $13 \div (-7)$

2.  $(-55) \div 7$

3.  $\frac{-48}{6}$

4.  $\frac{86}{-6}$

5.  $1 \div (-10)$

6.  $-20 \div (-1)$

7.  $19 \div (-4)$

8.  $(-143) \div 11$

9.  $\frac{-44}{4}$

## 11.1 Cumulative Review Warm Up

Find the vertex and the axis of symmetry of the graph of the function.

1.  $f(x) = 4x^2$

2.  $y = -\frac{1}{9}(x + 3)^2$

3.  $g(x) = 3(x - 2)^2$

4.  $r(x) = \frac{1}{5}(x - 9)^2$

5.  $d(x) = \frac{1}{6}(x + 4)^2$

6.  $f(x) = \frac{1}{5}(x + 5)^2$

**11.1****Practice A**

In Exercises 1 and 2, (a) find the mean, median, and mode of the data set and (b) determine which measure of center best represents the data. Explain.

- 3, 5, 2, 4, 3, 4, 3, 5, 16
- 13, 16, 10, 15, 12
- The table shows the lengths of 9 songs.

<b>Song lengths (minutes)</b>	3.2	3.5	3.2	3.8	7.2	4.2	3.4	3.5	3.5
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- Find the mean, median, and mode of the lengths.
- Which measure of center best represents the data? Explain.
- Identify the outlier. How does the outlier affect the mean, median, and mode?
- Describe one possible explanation for the outlier.

In Exercises 4 and 5, find the value of  $x$ .

- 3, 6, 4, 10,  $x$ ; The mean is 6.
- 13, 15, 17,  $x$ , 20, 21; The median is 18.
- The heights of a boys and girls track team are shown. Find the range of the heights for each team. Compare your results.

<b>Boys' heights (inches)</b>	84	75	77	82	80	80	81	78	79	80
<b>Girls' heights (inches)</b>	70	66	68	72	75	70	67	70	72	67

In Exercises 7 and 8, find (a) the range and (b) the standard deviation of the data set.

- 15, 25, 10, 20, 35
- 110, 88, 92, 104, 113, 107
- Consider the data in Exercise 6.
  - Find the standard deviation of the heights of the boys track team. Interpret your result.
  - Find the standard deviation of the heights of the girls track team. Interpret your result.
  - Compare the standard deviations for the boys and the girls track teams. What can you conclude?

# 11.1 Practice B

In Exercises 1 and 2, (a) find the mean, median, and mode of the data set and (b) determine which measure of center best represents the data. Explain.

- 5, 9, 4, 2, 5, 6, 7, 5, 9, 1, 9, 4
- 24, 18, 4, 20, 22, 26, 22, 24
- The table shows the weights of hams (in pounds).

Ham weight (pounds)	9.35	6.72	10.12	9.51	8.89	7.5	10.8	7.1	9.45
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- Find the mean, median, and mode of the lengths.
- Which measure of center best represents the data? Explain.
- A tenth ham is added, which weighs 6.5 pounds. How does this additional value affect the mean, median, and mode? Explain.

In Exercises 4 and 5, find the value of  $x$ .

- $-11.5, 12, -14.5, x$ ; The mean is 0.5.
- $42, 55, x, 80$ ; The median is 66.
- The table shows the lengths of hospital stays (in days) of patients due to gastrointestinal blockage.

Length of stay (days)	3	2	2	3	4	20	3	2	4
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- Identify the outlier. How does the outlier affect the mean, median, and mode?
- Describe one possible explanation for the outlier.

In Exercises 7 and 8, find (a) the range and (b) the standard deviation of the data set.

- 74, 52, 65, 64, 58
- 11.0, 8.8, 9.2, 10.4, 11.5, 12.7
- Find the values of the measures shown when each value in the data set is multiplied by 3.

Mean: 180

Median: 175

Mode: 150

Range: 80

Standard deviation: 24.5

## 11.1 Enrichment and Extension

### Challenge: Measures of Central Tendency

In Exercises 1–4, create your own real-life problems that will result in the following solutions. You must use a sample size of 10.

1. The mean of your data set is 13.5, and the mode is 10.
2. The mode of your data set is 25, and the range is 8.
3. The median of your data set is 67, and the mean is 60.
4. The mean and the median of your data set are the same.

Complete the exercise using your knowledge of measures of central tendency.

5. You and your family live in Northwestern Florida. *The Farmers Almanac* is predicting an unseasonable amount of rain for the year 2014. You and your siblings decide to keep track of the number of rainy days each month. The data you collect are as follows: 10, 11, 11, 14, 12, 10, 13, 7, 15, 11, 13, 14.
  - a. Find the mean, median, mode, and range of your data.
  - b. If the number of days it rains each month gets cut in half in the year 2015, what would be the mean, median, mode, and range?
  - c. If, instead, there were three fewer rainy days each month in the year 2015, what would the mean, median, mode, and range be?



## Puzzle Time

### How Do You Stop A Skunk From Smelling?

Write the letter of each answer in the box containing the exercise number.

**Find the mean, median, and mode of the data set.**

1. 4, 4, 2, 7, 1, 2, 3, 4, 18
2. 14, 7, 19, 13, 12
3. 8, 35, 12, 23, 16, 26, 21, 35

**Find the value of  $x$ .**

4. 6, 4, 13, 3, 10,  $x$ ; The mean is 10.
5. 11, 12, 14,  $x$ , 22, 27; The median is 16.
6. 14.5,  $-8$ ,  $-4.5$ ,  $x$ ; The mean is 9.5.
7. 40, 55,  $x$ , 110; The median is 61.

**Find the range and the standard deviation of the data set.**

8. 20, 15, 25, 35, 40
9. 43, 17, 19, 37, 38, 20
10. 8.1, 12.2, 1.5, 5.9, 2.3, 6.7, 9.1, 2.2
11. Find the values of the measures shown when each value in the data set increases by 12.

Mean: 40      Median: 36      Mode: 36

#### Answers

- I. 18
- P. 67
- U. 24
- N. 36
- S. mean: 22; median: 22; mode: 35
- O. range: 10.7; standard deviation: 3.56
- L. mean: 5; median: 4; mode: 4
- T. range: 26; standard deviation: 10.54
- E. range: 25; standard deviation: 9.27
- G. mean: 52; median: 48; mode: 48
- S. mean: 13; median: 13; mode: none

7	1	4	11		5	9	2		6	10	3	8
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