

11.3

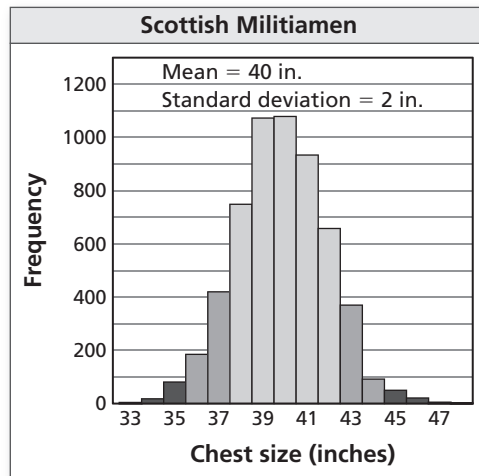
Shapes of Distributions

For use with Exploration 11.3

Essential Question How can you use a histogram to characterize the basic shape of a distribution?

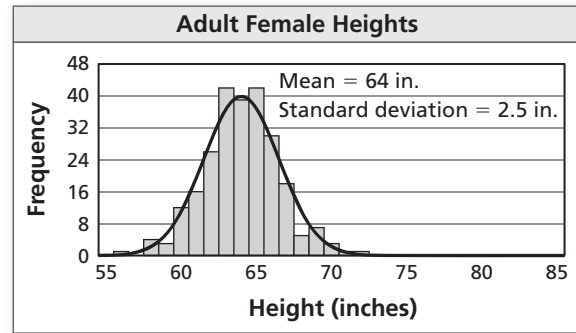
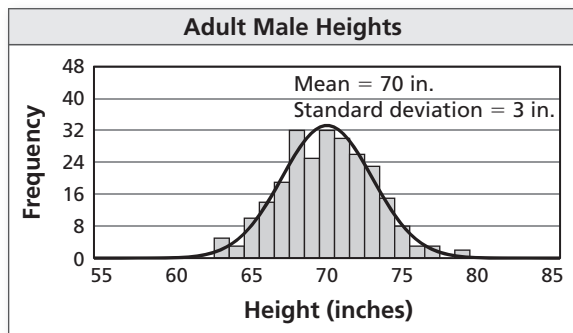
1 EXPLORATION: Analyzing a Famous Symmetric Distribution

Work with a partner. A famous data set was collected in Scotland in the mid-1800s. It contains the chest sizes, measured in inches, of 5738 men in the Scottish Militia. Estimate the percent of the chest sizes that lie within (a) 1 standard deviation of the mean, (b) 2 standard deviations of the mean, and (c) 3 standard deviations of the mean. Explain your reasoning.



11.3 Shapes of Distributions (continued)**2** **EXPLORATION:** Comparing Two Symmetric Distributions

Work with a partner. The graphs show the distributions of the heights of 250 adult American males and 250 adult American females.



- Which data set has a smaller standard deviation? Explain what this means in the context of the problem.
- Estimate the percent of male heights between 67 inches and 73 inches.

Communicate Your Answer

- How can you use a histogram to characterize the basic shape of a distribution?
- All three distributions in Explorations 1 and 2 are roughly symmetric. The histograms are called “bell-shaped.”
 - What are the characteristics of a symmetric distribution?
 - Why is a symmetric distribution called “bell-shaped?”
 - Give two other real-life examples of symmetric distributions.

11.3

Notetaking with Vocabulary

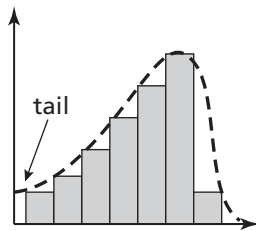
For use after Lesson 11.3

In your own words, write the meaning of each vocabulary term.
 histogram

frequency table

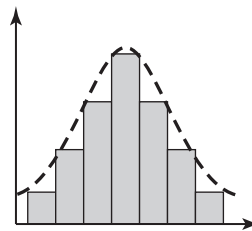
Core Concepts

Symmetric and Skewed Distributions



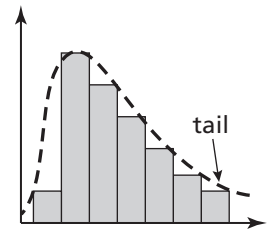
Skewed left

- The “tail” of the graph extends to the left.
- Most of the data are on the right.



Symmetric

- The data on the right of the distribution are approximately a mirror image of the data on the left of the distribution.



Skewed right

- The “tail” of the graph extends to the right.
- Most of the data are on the left.

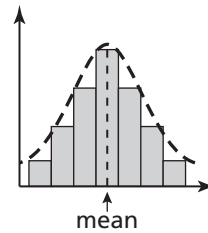
Notes:

11.3 Notetaking with Vocabulary (continued)

Choosing Appropriate Measures

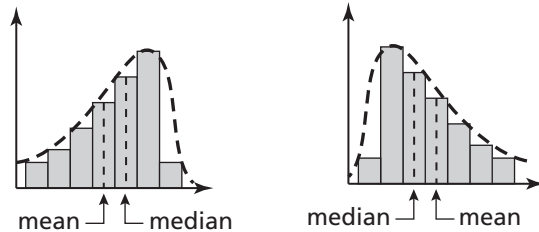
When a data distribution is symmetric,

- use the mean to describe the center and
- use the standard deviation to describe the variation.



When a data distribution is skewed,

- use the median to describe the center and
- use the five-number summary to describe the variation.



Notes:

Extra Practice

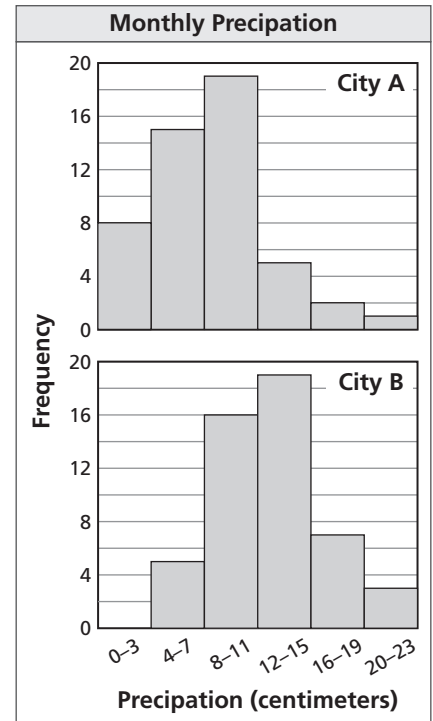
- The table shows the average annual snowfall (in inches) of 26 cities.
 - Display the data in a histogram using six intervals beginning with 15–28.

Average Annual Snowfall (inches)		
22	68	33
15	28	31
20	18	30
15	54	16
44	43	17
95	41	30
29	23	47
37	26	54
16	30	

- Which measures of center and variation best represent the data? Explain.
- A weather station lists the top 20 snowiest major cities. The city in 20th place had 51 inches of snow. How would you interpret the data?

11.3 Notetaking with Vocabulary (continued)

2. The double histogram shows the distributions of monthly precipitation for two towns over a 50-month period. Compare the distributions using their shapes and appropriate measures of center and variation.



3. The table shows the results of a survey that asked high school students how many hours a week they listen to music.

- a. Make a double box-and-whisker plot that represents the data. Describe the shape of each distribution.

	Females	Males
Survey size	50	58
Minimum	16	18
Maximum	40	52
1st Quartile	24	30
Median	28	38
3rd Quartile	32	46
Mean	28	30
Standard deviation	6	12

- b. Compare the number of hours of music listened to by females to the number of hours of music listened to by males.
- c. About how many females surveyed would you expect to listen to music between 22 and 34 hours per week?
- d. If you survey 100 more females, about how many would you expect to listen to music between 16 and 40 hours per week?