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LESSON
10.5

## Study Guide

For use with the lesson "Interpret Box-and-Whisker Plots"

## GOAL Make and interpret box-and-whisker plots.

## Vocabulary

A box-and-whisker plot organizes data values into four groups.
Ordered data are divided into lower and upper halves by the median. The median of the lower half is the lower quartile. The median of the upper half is the upper quartile.

The interquartile range of a data set is the difference of the upper quartile and the lower quartile.

A value that is widely separated from the rest of the data in a data set is called an outlier.

## EXAMPLE 1 Make a box-and-whisker plot

Calories Several brands of ready-to-eat cereals were compared. The number of calories in a serving of dry cereal for each brand is listed below. Make a box-andwhisker plot of the data.

153, 172, 213, 141, 155, 220, 165, 180, 132, 200, 191

## Solution

STEP 1 Order the data. Find the median and the quartiles.


STEP 2 Plot the median, the quartiles, the maximum value, and the minimum value below a number line.


STEP 3 Draw a box from the lower quartile to the upper quartile. Draw a vertical line through the median. Draw a line segment (a "whisker") from the box to the maximum and another from the box to the minimum.

## Exercise for Example 1

1. Make a box-and-whisker plot of the heights (in centimeters) of 9 seedling oak trees. $18,28,35,41,21,17,32,24,29$
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## EXAMPLE2 Interpret a box-and-whisker plot

Bird count The box-and-whisker plots show the number of American Goldfinches sighted each month for a year at two different wildlife reserves.

a. For how many months is reserve 2 's count at least 17 birds?
b. Compare the count in reserve 1 to the count in reserve 2 .

## Solution

a. For reserve 2 , the upper half is at least 17 Goldfinches. The median is 17 , so for 6 months, reserve 2 has 17 or more Goldfinch sightings each day.
b. The median count for reserve 1 is 25 . The median count for reserve 2 is 17 . In general, reserve 1 has more Goldfinch sightings than reserve 2.
For reserve 1 , the interquartile range is $27-19$, or 8 sightings. For reserve 2, the interquartile range is $23-11$, or 12 sightings. So, reserve 1 has less variation in the middle $50 \%$ of the data. The range for reserve 2 is greater than the range for reserve 1 . When all the data are considered, reserve 2 has more variation in Goldfinch sightings.

## Exercises for Example 2

2. Bird Count In Example 2, for how many months was the count lower than 11 at reserve 2 ?
3. Bird Count In Example 2, for how many months was the count at least 19 at reserve 1 ?
