9-4 Box-and-Whisker Plots

CONTENT STANDARDS
6.SP.4, 6.SP.5.a, 6.SP.5.b

What You'll Learn

To analyze a set of data by creating a box-and-whisker plot

New Vocabulary box-and-whisker plot, lower quartile, upper quartile

Why Learn This?

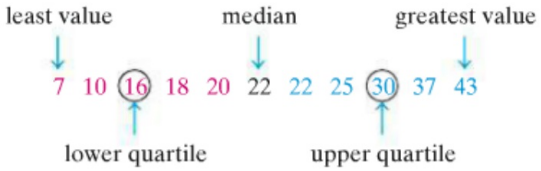
You can observe how data values, such as basketball scores, are distributed by displaying the data in a graph.

A **box-and-whisker plot**, or *box plot*, shows how a set of data is distributed. The plot uses five key values to represent an ordered set of data: the least value, the lower quartile, the median, the upper quartile, and the greatest value. The **lower quartile** is the median of the lower half of the data. **The upper quartile** is the median of the upper half of the data.

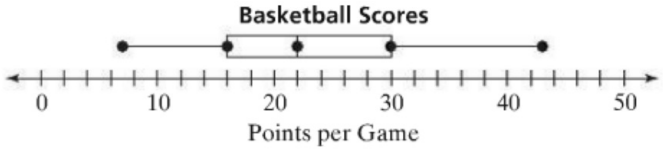
EXAMPLE Constructing a Box-and-Whisker Plot

1 A girls' basketball team had the following scores: 7, 10, 16, 18, 20, 22, 22, 25, 30, 37, 43. Construct a box-and-whisker plot to represent the data.

There are 11 observations in the data set. List the data in order to identify the five key values. The unit of measurement for this data set is points per game.



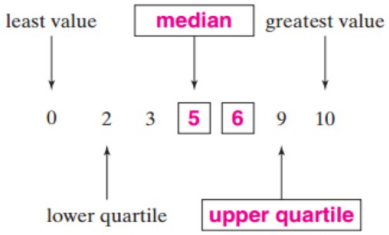
Graph the five key values above a number line. Label the number line with the unit of measurement. Draw a box from the lower to the upper quartile. Draw a vertical line inside at the median. Connect the least and greatest values to the box for the "whiskers."



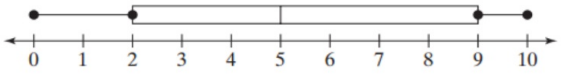
Example

1 **Constructing a Box-and-Whisker Plot** A school principal recorded the following number of students absent each day: 5, 3, 0, 9, 6, 2, 10. Construct a box-and-whisker plot to represent the data.

In the boxes below, list the data values in order and label the five key values.



Draw a number line from 1 to 10.



Draw a box from the lower quartile 2 to the upper quartile 9. Draw a vertical line at the median 5. Draw whiskers connecting the box to the least 0 and greatest 10 values.

Quick Check *Let's work this one together*

1. A girls' basketball team had the following scores: 7, 10, 16, 18, 20, 22, 22, 25, 30, 37, 43. The basketball team scored 40 points in a playoff game. Add the value 40 to the list of data. What are the five key values for a box-and-whisker plot that includes this game?

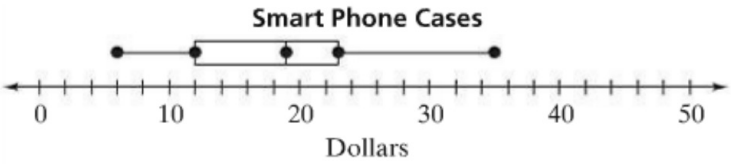
The lower quartile, median, and upper quartile of a box-and-whisker plot divide the data into four parts. Each part represents about one quarter of the data.

Vocabulary Tip

Quartile and quarter both start with the prefix *quart-*, which means four.

EXAMPLE Analyzing a Box-and-Whisker Plot

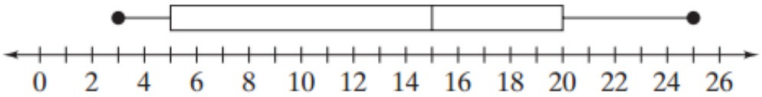
2 A store sells 16 different smart phone cases. The prices are represented in the box-and-whisker plot below. What is the unit of measurement for this set of data? What fraction of the smart phone cases are between $12 and $23?



The unit of measurement for the data is dollars. The lower quartile is $12 and the upper quartile is $23. Since each of the four parts of the box-and-whisker plot represents about one quarter of the data, about half of the data fall between $12 and $23.

Example

2 Analyzing a Box-and-Whisker Plot Olivia studied the prices for women's flip-flop sandals at different stores. She made the box-and-whisker plot below. Label the number line with the unit of measurement.



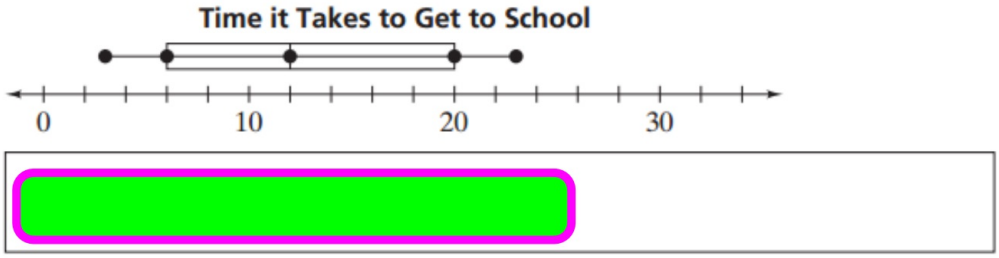
Prices (dollars)

The lower quartile is $5. The upper quartile is **$20**.

The fraction of the sandal prices that are between these values is **one-half**.

Quick Check

2. The box-and-whisker plot represents the number of minutes it takes 10 students to get to school. What is the unit of measurement for this set of data? What fraction of the students get to school in less than 20 minutes?



Vocabulary

A box-and-whisker plot is a type of graph that uses five key values of an ordered set of data to show how the set of data is distributed or shaped.

The lower quartile is the median of the lower half of a data set.

The upper quartile is the median of the upper half of a data set.

Name _____ Class _____ Date _____

Practice 9-4

Box-and-Whisker Plots

Tell how many observations are in the data set. Then construct a box-and-whicker plot to represent the data.

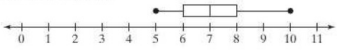
1. The number of cars coming into a parking garage each hour:

35, 40, 34, 25, 50, 35, 39. _____

2. The number of tickets to the dance recital sold by some students:

4, 2, 7, 10, 10, 5, 2, 20. _____

3. The box and whisker plot represents the cost of a lunch special at 10 different places.



a. One half of the lunch specials cost between $____ and $____.

b. What fraction of the lunch specials cost more than $8? _____

c. What fraction of the lunch specials cost less than $5? Explain.

_____