You can use a measure of center and a measure of variation to describe the distribution of a data set. The shape of the distribution can help you choose which measures are the most appropriate to use.

**Key Idea**

Choosing Appropriate Measures

The mean absolute deviation (MAD) uses the mean in its calculation. So, when a data distribution is symmetric,

- use the mean to describe the center and
- use the MAD to describe the variation.

The interquartile range (IQR) uses quartiles in its calculation. So, when a data distribution is skewed,

- use the median to describe the center and
- use the IQR to describe the variation.

**EXAMPLE 1** Choosing Appropriate Measures

The dot plot shows the average number of hours students in a class sleep each night.

![Dot plot showing average hours of sleep](image)

a. What are the most appropriate measures to describe the center and the variation?

Most of the data values are on the right clustered around 9, and the tail extends to the left. The distribution is skewed left.

- So, the median and the interquartile range are the most appropriate measures to describe the center and the variation.

b. Describe the center and the variation of the data set.

The median is 8.5 hours. The first quartile is 7.5, and the third quartile is 9. So, the interquartile range is $9 - 7.5 = 1.5$ hours.

- The data are centered around 8.5 hours. The middle half of the data varies by no more than 1.5 hours.
EXAMPLE 2 Choosing Appropriate Measures

The frequency table shows the number of states that border each state in the United States.

a. Display the data in a histogram.

Draw and label the axes. Then draw a bar to represent the frequency of each interval.

b. What are the most appropriate measures to describe the center and the variation?

The left side of the graph is approximately a mirror image of the right side of the graph. The distribution is symmetric.

So, the mean and the mean absolute deviation are the most appropriate measures to describe the center and the variation.

Practice

Choose the most appropriate measures to describe the center and the variation. Find the measures you chose.

1. Prices of Jeans

2. Weekly Biking Times

3. REASONING Can you find the exact values of the mean and the mean absolute deviation for the data in Example 2? Explain.

4. GAS MILEAGE The frequency table shows the gas mileages of several vehicles made by a company.

a. What are the most appropriate measures to describe the center and the variation?

b. What conclusions can you make?

5. OPEN-ENDED Construct a dot plot for which the mean is the most appropriate measure to describe the center of the distribution.