

11.1

Measures of Central Tendency And Dispersion

Statistics: numerical values to summarize
and compare sets of data

Measure of central tendency: used to
represent the center of a set of data
mean, median, mode

mean: sum of data divided by the number of points.

$$\bar{X} = \frac{X_1 + X_2 + \dots + X_n}{n}$$

median: the middle number when the data points are written in order.
(if n is even, the median is the mean of the 2 middle numbers)

mode: the number or numbers that occur most frequently

Measures of dispersion: used to tell how spread out the data is.

range and standard deviation

range: the difference between the greatest and the least number.

standard deviation: the typical difference between a data value and the mean.

$$\sigma = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{n}}$$

outlier: a value that is much greater or much less than the others.

Example: You are training for a triathlon. The miles you ride your bicycle for 7 weeks are:

17, 20, 16, 18, 22, 19, 20

Find the mean, median, mode, range and standard deviation.

The next week you only ride 3 miles.
Find the new measures of central tendency and dispersion.

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1, 4, 6, 11, 14, 18, 20

1. **VOCABULARY** Copy and complete: Measures of ? represent the center or middle of a data set. Measures of ? tell you how spread out the values in a data set are.

MEASURES OF CENTRAL TENDENCY In Exercises 3–6, find the mean, median, and mode of the data set.

4. A student's quiz scores for the first semester of an algebra class:
18, 20, 14, 15, 20, 17, 16
6. The waiting times (in minutes) of several people at a doctor's office:
24, 19, 30, 39, 22, 19, 26, 35, 42, 15, 25

MEASURES OF DISPERSION Find the range and standard deviation of the data set.

11. 7, 4, 6, 8, 5, 9, 5, 7

14. 44, 47, 45, 48, 45, 47, 50, 44, 48, 42

IDENTIFYING OUTLIERS Identify the outlier in the data set. Then find the mean, median, mode, range, and standard deviation of the data set when the outlier is included and when it is not.

18. 0, 72, 75, 75, 83, 83, 83, 91

20. 28, 20, 25, 28, 100, 25, 20