14-2

Study Guide

Measures of Central Tendency

The **mean** is found by adding the values in a set of data and dividing the sum by the number of values in that set. In other words, if a set of data has n values given by X_i such that i is an integer and $1 \leq i \leq n$, then the arithmetic mean $\overline{X}$ can be found as follows.

$$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$$

The **median** of a set of data is the middle value. If there are two middle values, the median is the mean of the two middle values. The **mode** of a set of data is the most frequent value. Some sets have multiple modes, and others have no mode.

Example 1 **Find the mean of the set {13, 18, 21, 14, 16, 19, 25, 17}.**

$$\overline{X} = \frac{\text{sum of the values in the set of data}}{\text{number of values in the set}}$$

$$\overline{X} = \frac{13 + 18 + 21 + 14 + 16 + 19 + 25 + 17}{8}$$

$$\overline{X} = \frac{143}{8} \text{ or } 17.875$$

The mean of the set of data is 17.875.

Example 2 **The table at the right shows the number of households without a telephone in 1990.**

State	Number of Households
Alaska	131,600
California	313,100
Florida	270,200
Georgia	195,700
Iowa	36,500
Kentucky	140,900
Minnesota	40,400
Nevada	25,100
New Mexico	67,500
Oklahoma	106,400
West Virginia	70,800

Source: U.S. Census Bureau

a. Find the mean of the data.

Since there are 11 states listed in the table, $n = 11$.

$$\frac{1}{11}\sum_{i=1}^{11} X_i = \frac{1}{11}(131{,}600 + 313{,}100 + 270{,}200 + 195{,}700 + 36{,}500 + 140{,}900 + 40{,}400 + 25{,}100 + 67{,}500 + 106{,}400 + 70{,}800)$$

The mean is about 127,109.

b. Find the median of the data.

To find the median, order the data. Since all the numbers are multiples of 100, you can order the set by hundreds.

251 365 404 675 708 1064 1316 1409 1957 2702 3131

Since there are an odd number of values, the median is the middle value, or 106,400.

c. Find the mode of the data.

Since all elements in the set of data have the same frequency, there is no mode.