

Measures of Center

1.2 Measures of Center

- One question we want to answer about data is about its location, particularly the location of its center.
- Measures of center include:
 - Mean
 - Median
 - Mode

1.2 Measures of Center

- **Mean** is denoted with the Greek letter μ when referring to the population mean and with the symbol \bar{x} when referring to the sample mean.
- We find the mean by adding up all the values and dividing by how many.

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

1.2 Measures of Center

- The **median** is found by putting all values in order from least to greatest and finding the middle value.
- If there are two middle values, we average those to find the median.

1.2 Measures of Center

- The **mode** is the value that occurs most often.
- Mode is used as a description of center for categorical data.

1.2 Measures of Center

Examples:

1. Twelve babies spoke for the first time at the following ages (in months):

8 9 10 11 12 13 15 15 18 20 20 26
1 2 3 4 5 6 7 8 9 10 11 12

- a. What is the mean of the data?

$$\bar{x} = \frac{(8+9+10+11+12+13+15+15+18+20+20+26)}{12} = 14.75$$

- b. What is the median of the data?

$$\text{median} = \frac{13+15}{2} = 14$$

- c. What is the mode of the data?

bimodal: modes are 15 and 20

1.2 Measures of Center

Examples:

2. Here are the weights (in pounds) of 20 steer on an experimental food diet:

174 142 131 145 175 150 176 151 110 162
133 163 135 178 178 154 166 146 156 167

a. What is the mean of the data? 154.6

b. What is the median of the data? 155

c. What is the mode of the data? 178

1.2 Measures of Center

Examples:

3. The test scores of a class of 20 students has a mean of 71.6 and the test scores of another class of 14 students have a mean of 78.4. Find the mean of the combined group.

$$n = 34$$

$$\frac{20(71.6) + 14(78.4)}{34} = 74.4$$

1.2 Measures of Center

Examples:

4. Explain why the conclusion drawn is not valid:

A business woman calculates the median cost of the five business trips that she took in a month is \$600 and concludes that the total cost must have been \$3000.

If mean was \$600 then total is \$3000.