



Start-Tech Academy

Measures of Center

A measure of center is a value at the center or middle of a data set.

TYPES

- Mean
- Median
- Mode
- Mid-range



MEAN

The **Mean** is obtained by dividing the sum of all values by the number of values in the data set

Formula

$$\text{Mean} = \frac{\text{Sum of all values}}{\text{Number of values}}$$

$$\text{Mean for population data: } \mu = \frac{\sum x}{N}$$

$$\text{Mean for sample data: } \bar{x} = \frac{\sum x}{n}$$

Where $\sum x$ is the sum of all values, N is the population size, n is the sample size, μ is the population mean, and \bar{x} is the sample mean.



MEAN

The **Mean** is obtained by dividing the sum of all values by the number of values in the data set

Example

What is the average or the mean height of the following students:

Student	Height
A	168
B	182
C	170
D	155
E	159

$$\text{Mean} = (168+182+170+155+159)/ 5 = 824/5 = 164.8$$



MEDIAN

The **Median** is the value of the middle term in a data set that has been ranked in increasing order.

Steps

1. Rank the data set in increasing order.
2. Find the middle term. The value of this term is the median.

Note that if the number of observations in a data set is odd, then the median is given by the value of the middle term in the ranked data.
However, if the number of observations is even, then the median is given by the average of the values of the two middle terms.



MEDIAN

The **Median** is the value of the middle term in a data set that has been ranked in increasing order.

Example

What is the median height of the following students:

Student	Height
A	168
B	182
C	170
D	155
E	159

1. Order in ascending order -> 155,159,168,179,182
2. Select the middle value -> 168



MODE

The **Mode** of a data set is the value that occurs with the greatest frequency.

Note

- When **two data values** occur with the same greatest frequency, each one is a mode and the data set is **bimodal**
- When **more than two data values** occur with the same greatest frequency, each is a mode and the data set is said to be **multimodal**
- When **no data value** is repeated, we say that there is **no mode**



MODE

The **Mode** of a data set is the value that occurs with the greatest frequency.

Example

What is the Mode height of the following students:

Student	Height
A	168
B	182
C	168
D	155
E	159

168 appears two times while rest of the values appear only once.
Therefore, 168 is the Mode height

MIDRANGE

The **Midrange** is the value midway between the maximum and minimum values in the original data set.

Formula

$$\text{midrange} = \frac{\text{maximum data value} + \text{minimum data value}}{2}$$



MIDRANGE

The **Midrange** is the value midway between the maximum and minimum values in the original data set.

Example

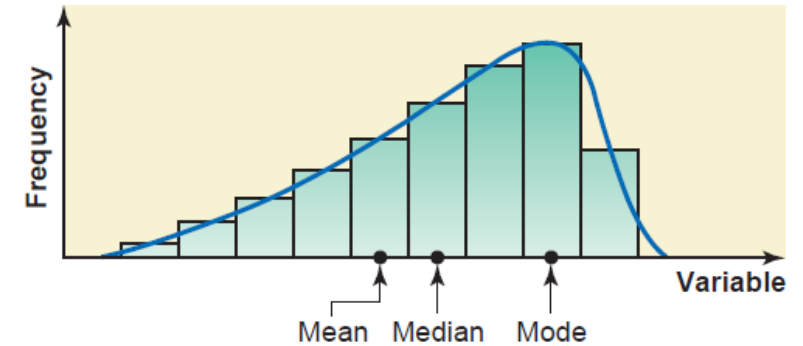
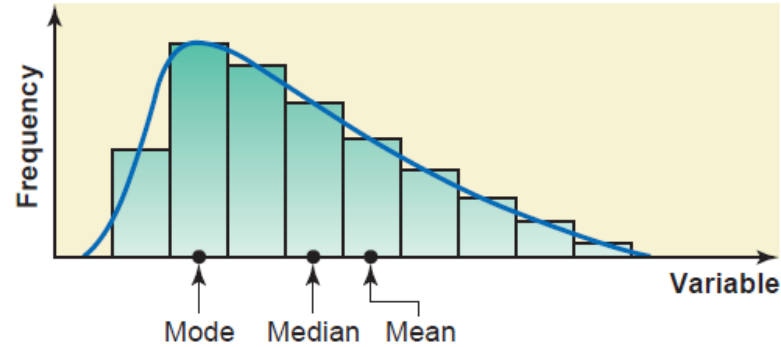
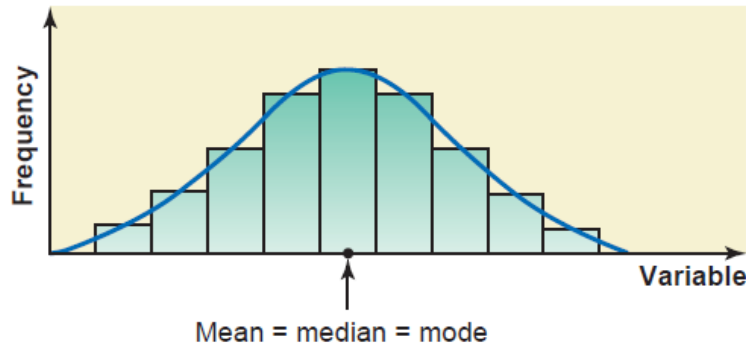
What is the Midrange of the following students:

Student	Height
A	168
B	182
C	168
D	155
E	159

$$\text{Midrange} = (155 + 182)/2 = 168.5$$



COMPARISON OF CENTERS



- For a symmetric distribution curve with one peak, the values of the mean, median, and mode are identical
- For a distribution curve skewed to the right, the value of the mean is the largest, that of the mode is the smallest, and the value of the median lies between these two.
- Mean is not always the best measure of central tendency because it is heavily influenced by outliers. Median is preferred over mean for this reason
- One advantage of the mode is that it can be calculated for both kinds of data —quantitative and qualitative— whereas the mean and median can be calculated for only quantitative data.

