

## **Measures of Central Tendency**

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### **Central Tendency**

The general level, characteristic, or typical value that is representative of the majority of cases is referred as central or average value in general. The tendency of observations to gather around the central part of data is called central tendency.

### **Measure of Central Tendency**

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

#### **Arithmetic Mean**

It is a type of average (measure of central tendency), which is defined as the sum of all the values in a set of numerical data divided by total number of observations in that data set. This is the most commonly used measure of central tendency and is simply called Mean. It is labeled as either  $\mu$  (lowercase Greek letter "mu") to denote a population mean or  $\bar{X}$  ( $X$ -bar) to denote a sample mean.

#### **Weighted Mean**

An average of means calculated by weighting each individual mean according to the number of data points that made up that individual mean.

#### **Geometric Mean**

A mean of  $n$  objects that is computed by taking the  $n$ -th root of the product of the  $n$  terms. A measure of the central tendency of a data set that minimizes the effects of extreme values.

#### **Harmonic Mean**

It is reciprocal of the mean of reciprocal values.

#### **Median**

The median of a set of scores is the middle value when the scores are arranged in order of increasing (or decreasing) magnitude. The median is often denoted by  $\tilde{X}$  ( $X$ -tilde).

**Mode**

The mode is the value that has the largest frequency in a data set. When two scores occur with the same greatest frequency, each one is Mode and the data set is called bimodal. When a data set has more than two modes, it is called multimodal.

**Empirical Relation among Mean, Median, and Mode**

There is an empirical relation between mean, median and mode that is

$$\text{Mode} = 3 \text{ Median} - 2 \text{ Mean.}$$

**Quartile**

A quartile is any of the 3 values which divide the sorted data set into 4 equal parts, so that each part represents 1/4th of the sample or population. It is denoted by  $Q_i$  ( $i = 1, 2, 3$ ). The second quartile is, obviously, equal to median.

**Deciles**

A decile is any of the 9 values which divide the sorted data set into 10 equal parts, so that each part represents 1/10th of the sample or population. It is denoted by  $D_i$  ( $i = 1, 2, \dots, 9$ ). The 5th decile is, obviously, equal to median.

**Percentile**

A percentile is any of the 99 values which divide the sorted data set into 100 equal parts, so that each part represents 1/100th of the sample or population. It is denoted by  $P_i$  ( $i = 1, 2, \dots, 99$ ). The 50th percentile is, obviously, equal to median.

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