

## Mean and Median

1. The mean value of a variable is defined as the sum of all the values of the variable divided by the number of values.
2. The mean of ungrouped or raw data is given by  $\text{Mean} = \bar{x} = \frac{\text{sum of observations}}{\text{Number of observations}}$ .
3. If  $x_1, x_2, x_3, \dots, x_n$  are  $n$  values of a variable  $X$ , then the arithmetic mean of these values is given by:

$$\text{Mean } (\bar{x}) = \frac{1}{n} \sum_{i=1}^n x_i$$

If a variate  $X$  takes values  $x_1, x_2, x_3, \dots, x_n$  with corresponding frequencies  $f_1, f_2, f_3, \dots, f_n$  respectively, then arithmetic mean of these values is given by

$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{\sum f_i}$$

This gives the mean for ungrouped frequency distribution.

4. Median is the value of middle most observation(s).
5. The median is calculated only after arranging the data in ascending order or descending order.

$$\text{Median} = \begin{cases} \text{If } n \text{ is odd, then median} = \left( \frac{n+1}{2} \right)^{\text{th}} \text{ observation} \\ \text{If } n \text{ is even, then median} = \left( \frac{\left( \frac{n}{2} \right)^{\text{th}} \text{ observation} + \left( \frac{n}{2} + 1 \right)^{\text{th}} \text{ observation}}{2} \right) \end{cases}$$