

**Name:** Ankit Sharma

**Email:** [kumarankitx022@gmail.com](mailto:kumarankitx022@gmail.com)

**Mob no.:** +91-7677241423

## ASSIGNMENT – 01

**MEAN:** Mean is the most commonly used measure of central tendency. There are different types of mean, viz. arithmetic mean, weighted mean, geometric mean (GM) and harmonic mean (HM).

**1. Arithmetic mean** (or, simply, “mean”) is nothing but the average. It is computed by adding all the values in the data set divided by the number of observations in it.

$$\bar{X} = \frac{X_1 + X_2 + X_3 + \dots + X_n}{n} = \frac{\sum X}{n}$$

**2. Weighted mean:** When the values are not of equal importance, we assign them certain numerical values to express their relative importance. These numerical values are called weights. If  $X_1, X_2, \dots, X_k$  have weights  $W_1, W_2, \dots, W_k$ , then the **weighted arithmetic mean** or the **weighted  $\bar{X}_w$  mean**, which is denoted as  $\bar{X}_w$ , is calculated by the following formula;

$$\bar{X}_w = \frac{W_1X_1 + W_2X_2 + \dots + W_kX_k}{W_1 + W_2 + \dots + W_k} = \frac{\sum WX}{\sum W}$$

**3. Geometric mean:** The geometric mean,  $G$ , of a set of  $n$  positive values  $X_1, X_2, \dots, X_n$  is the  $n$ th root of the product of the values. Mathematically the formula for geometric mean will be as follows;

$$G = \sqrt[n]{X_1, X_2, \dots, X_n}$$
$$= (X_1, X_2, \dots, X_n)^{1/n}$$

In practice, it is difficult to extract higher roots. The geometric mean is, therefore, computed using logarithms. Mathematically, it will be represented as follows;

$$\text{Log } G = \frac{\log X_1 + \log X_2 + \dots + \log X_n}{n} = \frac{\log \sum X}{n}$$

**4. Harmonic mean:** The harmonic mean, **H**, of a set of **n** values **X<sub>1</sub>, X<sub>2</sub>, ....., X<sub>n</sub>** is the reciprocal of the arithmetic mean of the reciprocals of the values. Mathematically, the formula for harmonic mean will be as follows;

$$H = \frac{n}{\frac{1}{X_1} + \frac{1}{X_2} + \dots + \frac{1}{X_n}}$$

$$= \frac{n}{\Sigma \left( \frac{1}{X} \right)}$$