

# **MEASURES OF DISPERSION**

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# 1. MEASURES OF DISPERSION

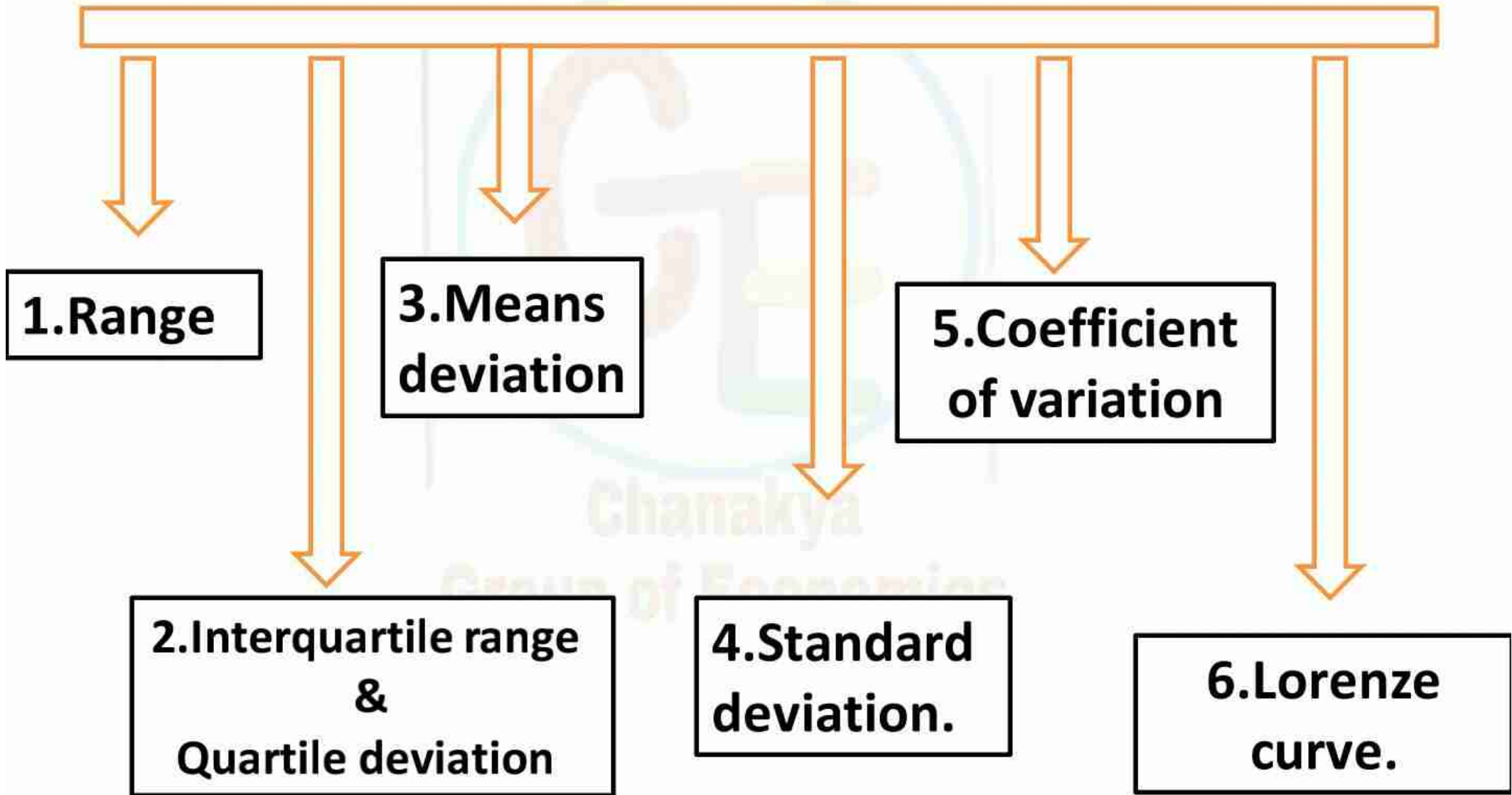
## INTRO--

Dispersion is a **measure of the variation** of the items.

If value of items are **same** then there is **no variance** and **dispersion will be zero.**

More variations more will be **dispersion.**

# **METHODS OF MEASURING DISPERSION**



## 1. Range

It is **simplest measure** of dispersion.

It is define the difference b/w largest and smallest value.

$$R=L - S$$

15,22,17,32,28

Largest value = 32      smallest value = 15

$$R=L - S$$

$$R= 32-15= 17.$$

## Coefficient of Range

$$\frac{L-S}{L+S} = \frac{32-15}{32+15} = \frac{17}{47} = 0.36$$

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## 2. Interquartile range & Quartile deviation

### A. Interquartile range.

It is the difference b/w upper **upper quartile (Q3)** and **lower quartile(Q1)**

$$\text{IQ.Range} = Q3 - Q1$$

### B. Quartile deviation.

It also called as **semi-interquartile.**

$$Q.D = \frac{Q3 - Q1}{2}$$

## C. Coefficient of Quartile deviation.

$$\text{Coeff. Of Q.D} = \frac{Q3-Q1}{Q3+Q1}$$

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### 3.Means deviation

It is also known as **average deviation**.

Mean deviation can be can be computed either from the **mean or median**.

$$\text{M.D from median} = \frac{\sum(X-M)}{N}$$

$$\text{M.D from Mean} = \frac{\sum(X-\bar{x})}{N}$$



## 4. Standard deviation

Standard deviation is **most widely** used measure of dispersion.

S.D first used by **Karl Pearson**. In 1893.

S.D is also called as **root mean square deviation**.

S.D is denoted as –  **$\sigma$  OR  $s$**

$$\sigma = \sqrt{\frac{\sum(X-\bar{x})^2}{N}}$$

S.D is widely used in **sampling theory and test of significant**.

**Coefficient of S.D =  $\frac{\sigma}{\bar{x}}$**

## **Difference between mean deviation and S.D**

**1. In M.D sign + and – ignored.**

**In S.D +,- sign not ignored.**

**2. M.D can be calculated either from **mean ,median and mode.****

**S.D is always computed from **mean only.****

## Variance

It is also a measure of dispersion.

The term variance is first used by **R.A.Fisher in 1918.**

Variance is the square of the **standard deviation.**

$$\text{Variance} = \sigma^2$$

$$\text{Variance} = \frac{\sum f(X - \bar{x})^2}{N}$$

## 5.Coefficient of variance.

Coefficient of variation is an important **relative measure** of dispersion.

It was developed by **Karl Pearson**.

It is widely used in comparing the variability of two or more series.

It is denoted as **C.V.**

$$\text{C.V.} = \frac{\sigma}{\bar{x}} * 100$$