READING MATERIAL

- Measures of dispersion are Range, Quartile Deviation, Mean Deviation, Variance.

- Range = Maximum value – Minimum value

- Mean deviation for ungrouped data

$$\mathrm{MD}(\bar{x}) = \frac{\sum_{i=1}^{n}|x_i - \bar{x}|}{n} \qquad \mathrm{MD}(M) = \frac{\sum_{i=1}^{n}|x_i - M|}{n}$$

- Mean deviation for grouped data

$$\mathrm{MD}(\bar{x}) = \frac{\sum_{i=1}^{n}|x_i - \bar{x}|}{N} \qquad \mathrm{MD}(M) = \frac{\sum_{i=1}^{n}|x_i - M|}{N}$$

Where, $N = \sum_{i=1}^{n} f_i$

- Variance and Standard Deviation for ungrouped data

$$\sigma^2(x) = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n} \qquad \sigma(x) = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}}$$

- Variance and Standard Deviation of a discrete frequency distribution

$$\sigma^2(x) = \frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})^2}{N} \qquad \sigma(x) = \sqrt{\frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})^2}{N}}$$

- Variance and Standard Deviation of a discrete frequency distribution

$$\sigma^2(x) = \frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})^2}{N} \qquad \sigma(x) = \frac{1}{N}\sqrt{[N\Sigma_{i=1}^{n} f_i x_i^2 - (\Sigma_{i=1}^{n} f_i x_i)^2]}$$

- Shortcut method to find Variance and Standard Deviation

$$\sigma = \frac{h^2}{N^2}\left[N\sum_{1}^{n} f_i\, {y_i}^2 - \left(\sum_{1}^{n} f_i y_i\right)^2\right]$$

$$\sigma = \frac{h}{N}\sqrt{N\sum_{1}^{n} f_i\, {y_i}^2 - \left(\sum_{1}^{n} f_i y_i\right)^2}$$

Where,

$$y_i = \frac{x_i - A}{h}$$

- Coefficient of Variation = $\frac{\sigma}{x}$x100, $\bar{x} \neq 0$

For series with equal means, the series with lesser Standard Deviation is more consistent or less scattered.