

Statistics

Father of Modern Statistics : **Sir Ronald Fisher FRS**

Quartiles :

1) **First Quartile (Q_1)** = $(\frac{N+1}{4})$ th term

2) **Second Quartile (Q_2) = Median (M_d)** = $2(\frac{N+1}{4})$ th term
= $(\frac{N+1}{2})$ th term

3) **Third Quartile (Q_3)** = $3(\frac{N+1}{4})$ th term

Where, N --> number of total terms

We can write **$N = \Sigma f$** .

Deciles :

4) **First Decile (D_1)** = $(\frac{N+1}{10})$ th term

5) **Second Decile (D_2)** = $2(\frac{N+1}{10})$ th term

6) **Third Decile (D_3)** = $3(\frac{N+1}{10})$ th term

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7) N^{th} Decile (D_n) = $n(\frac{N+1}{10})$ th term

Where, $n \rightarrow$ position number of decile which is
1,2,3,-----,9

Percentile :

8) First Percentile (P_1) = $(\frac{N+1}{100})$ th term

9) Second Percentile (P_2) = $2(\frac{N+1}{100})$ th term

10) Third Percentile (P_3) = $3(\frac{N+1}{100})$ th term

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11) N^{th} Percentile (P_n) = $n(\frac{N+1}{100})$ th term

Where, $n \rightarrow$ position number of percentile which is
1,2,3,-----,99

Dispersion :

12) Quartile Deviation (QD) = $\frac{Q_3 - Q_1}{2}$

13) Coefficient of Quartile Deviation (CQD) = $\frac{Q_3 - Q_1}{Q_3 + Q_1}$

Individual Series

$$14) \text{ Mean } (\bar{X}) = \frac{\sum X}{N}$$

$$15) \text{ Mean Deviation from MEAN} = \frac{\sum |X - \bar{X}|}{N}$$

$$16) \text{ Mean Deviation from MEDIAN} = \frac{\sum |X - M_d|}{N}$$

$$17) \text{ Mean Deviation (MD)} = \frac{\sum |D|}{N}$$

I) From **MEAN**, $D = X - \bar{X}$

II) From **MEDIAN**, $D = X - M_d$

III) $D = x - A$ Where, $A \rightarrow$ Assumed average mean or median of series

$$18) \text{ Standard Deviation } (\sigma) = \sqrt{\frac{\sum (X - \bar{X})^2}{N}} = \sqrt{\frac{\sum d^2}{N}}$$

This is **Indirect Method**.

$$19) \text{ Standard Deviation } (\sigma) = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2}$$

This is **Direct Method**. We can use '**x**' or '**D**' instead of '**d**' .

Discrete Series

$$20) \text{ Mean } (\bar{X}) = \frac{\sum fX}{N}$$

$$21) \text{ Mean Deviation from MEAN} = \frac{\sum f|X - \bar{X}|}{N}$$

$$22) \text{ Mean Deviation from MEDIAN} = \frac{\sum f|X - M_d|}{N}$$

$$23) \text{ Mean Deviation (MD)} = \frac{\sum f|D|}{N}$$

Where, D --> It is same as **Individual Series**.

$$24) \text{ Coefficient of Mean Deviation from Mean is} \\ = \frac{\text{MeanDeviation(FromMean)}}{\text{Mean}} = \frac{MD}{\bar{X}}$$

$$25) \text{ Coefficient of Mean Deviation from Median is} \\ = \frac{\text{MeanDeviation(FromMedian)}}{\text{Median}} = \frac{MD}{M_d}$$

$$26) \text{ Standard Deviation } (\sigma) = \sqrt{\frac{\sum f(X - \bar{X})^2}{N}} = \sqrt{\frac{\sum fd^2}{N}}$$

$$27) \text{ Standard Deviation } (\sigma) = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

Where, f--> frequency

$$28) \text{ Coefficient of Standard Deviation (CSD)} = \frac{\sigma}{\bar{X}}$$

29) Coefficient of Dispersion = $\frac{\sigma}{\bar{X}} \times 100\% = \text{CSD} \times 100\%$

Thank You!!!