Formulas.

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1) Mean $= \frac{\Sigma x_i f_i}{\Sigma f_i}$

2) Median $= \frac{L+H}{2}$

3) Mode $\rightarrow$ most occurring frequency.

4) 3median $-$ 2mean $=$ mode

5) $M.D = \frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})}{N}$

6) $SD = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{N}}$ } ungrouped (normal)

7) S.D for Discrete $= \sqrt{\frac{\sum_{i=1}^{n} f_i (x_i - \mu)^2}{N}}$

$\rightarrow$ continuous $= \sqrt{\frac{\sum_{i=1}^{n} f_i (x_i - \mu)^2}{N}}$ } grouped

8) variance $= \frac{(x_i - \bar{x})^2}{N} = \sigma^2$, $SD = \sigma$, $V = \sigma^2$

$\boxed{\sqrt{\text{variance}} = SD}$.

9) Quartile Deviation $= \frac{Q_3 - Q_1}{2}$

Q_3 = highest deviation, Q_1 = lowest deviation.

$Q_1 = \text{size}\left[\frac{n+1}{4}\right]^{th}$, $Q_3 = \text{size of } 3\left(\frac{n+1}{4}\right)^{th}$

coff $= \frac{Q_3 - Q_1}{Q_3 + Q_1}$,

InterQuartile Range $= \{Q_3 - Q_1\}$

*Grouped :- $Q_1 = \left[\frac{N}{4}\right]$, $Q_3 = 3\left[\frac{N}{4}\right]$

$\boxed{Q_1 = l + \left(\frac{n/4 - cf}{f}\right) \times i}$, $\boxed{Q_3 = l + 3 * \left(\frac{n/4 - cf}{f}\right) \times i}$

Ungrouped :-

* Coff of Range :- Ungrouped :-

$$\left\{ \frac{\text{Largest} - \text{smallest}}{\text{Largest} + \text{Smallest}} \right\}$$

* coff of mean deviation :-

$$M.D = \frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})}{N}$$

$$\text{coff } MD_{\bar{x}} = \frac{MD_{\bar{x}}}{\bar{x}}$$

* coff of variance = $\boxed{SD/\text{mean} \times 100}$ = $SD = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \mu)^2}{N}}$

SD when given in question formulae $t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$

when not given for one value = $t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n-1}}}$ } not give

$$\boxed{s = \frac{1}{n-1}\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]}$$ → for one values

when given 2 values.

$$s = \frac{1}{n_A + n_B - 2}\left\{\sum x_A^2 - \frac{(\sum x_A)^2}{n_A} + \sum x_B^2 - \frac{(\sum x_B)^2}{n_B}\right\}$$

→ Z square test :-

$$Z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

→ t square test :- $t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$ $\{\bar{x} - \mu = m\}$

→ chi square test : $\chi_c^2 = \frac{\sum(O_i - E_i)^2}{E_i}$

→ F test :- $F = \frac{s_1^2}{s_2^2}$

$$s_1^2 = \frac{\sum(\bar{x}_1 - \bar{x})^2}{n_1 - 1}$$

$$s_2^2 = \sum(x_2 - \bar{x})^2$$

$$S_2 = \frac{\sum (x_2 \ldots}{n_2 - 1}$$

$\{ v_1 = n_1 - 1 , \quad v_2 = n_2 - 1 \}$

when x value is not given,

$$S_1^2 = \frac{n_1 (s_1^2)}{n_1 - 1} , \quad S_2^2 = \frac{n_2 (s_2)^2}{n_2 - 1}$$

* Regression = analysis dependent data upon independent data:

1 I → More D → one linear

1 D → More I → multiple linear.