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Measures of Dispersion Formulas

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List of 14 Measures of Dispersion Formulas

Measures of Dispersion

Quartile Deviation

1) Quartile Deviation

Open Calculator

fx $$QD = \frac{Q_3 - Q_1}{2}$$

ex $$30 = \frac{80 - 20}{2}$$

2) Quartile Deviation given Coefficient of Quartile Deviation

Open Calculator

fx $$QD = CQ \cdot \left(\frac{Q_3 + Q_1}{2} \right)$$

ex $$30 = 0.6 \cdot \left(\frac{80 + 20}{2} \right)$$

Standard Deviation

3) Pooled Standard Deviation

Open Calculator

$$\sigma_{\text{Pooled}} = \sqrt{\frac{\left(\left(N_X - 1\right) \cdot \left(\sigma_X^2\right)\right) + \left(\left(N_Y - 1\right) \cdot \left(\sigma_Y^2\right)\right)}{N_X + N_Y - 2}}$$

ex $$35.00833 = \sqrt{\frac{\left(\left(8 - 1\right) \cdot \left(\left(29\right)^2\right)\right) + \left(\left(6 - 1\right) \cdot \left(\left(42\right)^2\right)\right)}{8 + 6 - 2}}$$

4) Standard Deviation given Coefficient of Variation

Open Calculator

$$\sigma = \mu \cdot \text{CV}_{\text{Ratio}}$$

ex $$2.505 = 1.5 \cdot 1.67$$

5) Standard Deviation given Coefficient of Variation Percentage

Open Calculator

$$\sigma = \frac{\mu \cdot \text{CV}_{\%}}{100}$$

ex $$2.505 = \frac{1.5 \cdot 167}{100}$$

6) Standard Deviation given Mean

Open Calculator

fx $$\sigma = \sqrt{\left(\frac{\Sigma x^2}{N}\right) - \left(\mu^2\right)}$$

ex $$2.5 = \sqrt{\left(\frac{85}{10}\right) - \left((1.5)^2\right)}$$

7) Standard Deviation given Variance

Open Calculator

fx $$\sigma = \sqrt{\sigma^2}$$

ex $$2.5 = \sqrt{6.25}$$

8) Standard Deviation of Data

Open Calculator

fx $$\sigma = \sqrt{\left(\frac{\Sigma x^2}{N}\right) - \left(\left(\frac{\Sigma x}{N}\right)^2\right)}$$

ex $$2.5 = \sqrt{\left(\frac{85}{10}\right) - \left(\left(\frac{15}{10}\right)^2\right)}$$

9) Standard Deviation of Sum of Independent Random Variables

Open Calculator

fx $$\sigma_{(X+Y)} = \sqrt{\left(\sigma^2_{X(Random)}\right) + \left(\sigma^2_{Y(Random)}\right)}$$

ex $$5 = \sqrt{\left((3)^2\right) + \left((4)^2\right)}$$

Variance

10) Pooled Variance

fx

Open Calculator

$$V_{Pooled} = \frac{\left((N_X - 1) \cdot \left(\sigma^2 X\right)\right) + \left((N_Y - 1) \cdot \left(\sigma^2 Y\right)\right)}{N_X + N_Y - 2}$$

ex $$1225.417 = \frac{((8 - 1) \cdot 840) + ((6 - 1) \cdot 1765)}{8 + 6 - 2}$$

11) Variance given Standard Deviation

Open Calculator

fx $$\sigma^2 = (\sigma)^2$$

ex $$6.25 = (2.5)^2$$

12) Variance of Data

Open Calculator

fx $$\sigma^2 = \left(\frac{\Sigma x^2}{N}\right) - \left(\mu^2\right)$$

ex $$6.25 = \left(\frac{85}{10}\right) - \left((1.5)^2\right)$$

13) Variance of Scalar Multiple of Random Variable

Open Calculator

fx $$V_{cX} = \left(c^2\right) \cdot \left(\sigma^2 \text{Random X}\right)$$

ex $$36 = \left((2)^2\right) \cdot 9$$

14) Variance of Sum of Independent Random Variables

Open Calculator

fx $$\left(\sigma^2 \text{Sum}\right) = \left(\sigma^2 \text{Random X}\right) + \left(\sigma^2 \text{Random Y}\right)$$

ex $$25 = 9 + 16$$

Variables Used

- c Scalar Value c
- CQ Coefficient of Quartile Deviation
- $CV_{\%}$ Coefficient of Variation Percentage
- CV_{Ratio} Coefficient of Variation Ratio
- N Number of Individual Values
- N_X Size of Sample X
- N_Y Size of Sample Y
- Q_1 First Quartile of Data
- Q_3 Third Quartile of Data
- QD Quartile Deviation of Data
- V_{cX} Variance of Scalar Multiple of Random Variable
- V_{Pooled} Pooled Variance
- μ Mean of Data
- σ Standard Deviation of Data
- $\sigma_{(X+Y)}$ Standard Deviation of Sum of Random Variables
- σ_{Pooled} Pooled Standard Deviation
- σ_X Standard Deviation of Sample X
- $\sigma_{X(Random)}$ Standard Deviation of Random Variable X
- σ_Y Standard Deviation of Sample Y
- $\sigma_{Y(Random)}$ Standard Deviation of Random Variable Y
- σ^2 Variance of Data

- σ^2**Random X** Variance of Random Variable X
- σ^2**Random Y** Variance of Random Variable Y
- σ^2**Sum** Variance of Sum of Independent Random Variables
- σ^2**X** Variance of Sample X
- σ^2**Y** Variance of Sample Y
- Σx Sum of Individual Values
- Σx^2 Sum of Squares of Individual Values

Constants, Functions, Measurements used

- Function: **sqrt**, sqrt(Number)
  Square root function

Check other formula lists

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