

Standard Deviation

B.A-III

(1)

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$$S.D = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

Where,

\bar{x} = mean value of distribution.

n = number of terms.

Let us calculate standard deviation for a simple sequence - 1, 3, 3, 3, 5. We will divide the entire process into five steps.

Step 1 - Calculate the mean value.

$$\text{Mean} = \frac{1+3+3+3+5}{5} = 3$$

Step 2 - Take the difference of all the terms from the mean value ($x - \bar{x}$)

$$1-3 = -2, 3-3 = 0, 3-3 = 0, 3-3 = 0, 5-3 = 2$$

Step 3 - Square all these difference
 $(-2)^2 = 4, 0^2 = 0, 0^2 = 0, 0^2 = 0, (2)^2 = 4$

Step 4 - Take the average of the squares in step 3

$$\text{Average} = \frac{4+0+0+0+4}{5} = \frac{8}{5}$$

Step 5 - Square root of the average is the standard deviation = $\sqrt{8/5}$

standard deviation is denoted by greek letter 'σ'

