

Answer on Question#39497 – Math – Statistics

Question:

Calculate the standard deviation from following data?

Size of items	Frequency
6	3
7	6
8	9
9	13
10	8
11	5
12	4

Solution:

For a finite set of numbers, the standard deviation is found by taking the square root of the average of the squared differences of the values from their average value.

Average value equals:

$$\bar{a} = \frac{6 * 3 + 7 * 6 + 8 * 9 + 9 * 13 + 10 * 8 + 11 * 5 + 12 * 4}{3 + 6 + 9 + 13 + 8 + 5 + 4} = 9$$

Therefore, standard deviation equals:

$$\begin{aligned} \sigma &= \sqrt{\frac{[3 * (6 - 9)^2 + 6 * (7 - 9)^2 + 9 * (8 - 9)^2 + 13 * (9 - 9)^2 + 8 * (10 - 9)^2 + 5 * (11 - 9)^2 + 4 * (12 - 9)^2]}{3 + 6 + 9 + 13 + 8 + 5 + 4}} \\ &= \sqrt{\frac{3 * 3^2 + 6 * 2^2 + 9 * 1^2 + 13 * 0^2 + 8 * 1^2 + 5 * 2^2 + 4 * 3^2}{3 + 6 + 9 + 13 + 8 + 5 + 4}} = 1.61 \end{aligned}$$

We have calculated the so-called uncorrected sample standard deviation. There also exists a corrected sample standard deviation = $\sqrt{\frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{a})^2}$.

Answer: 1.61