IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

STATISTICAL INTERPRETATION ON STANDARD DEVIATION, SAMPLE STANDARD DEVIATION AND MEAN IN CASE OF INDIVIDUAL DATA

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Abstract

Our research's title is statistical interpretation on Standard Deviation, Sample Standard Deviation and mean in case of individual data. We took individual data for our research. Our research's rule can be used only in individual data. We used "qualitative method" in our research. We used two or more than two persons in our research for inquiry. Our research finding is in individual data if we have two or more than two data, we get many differences. If we calculate standard deviation and sample standard deviation by differences of actual data, we get double data's standard deviation and sample standard deviation of actual data. We should divide by '2' in these deviations to get standard deviation and sample standard deviation of actual data.

First, we should add all differences of actual data, and then we should calculate mean of all differences, again we should add sum of actual data in mean so that we can get mean of double data. We should divide by '2' in this mean to get mean of actual data. Above mentioning few words are our research findings. Keywords: standard deviation, mean, statistical interpretation, sample mean, mean differences.

3. Introduction :

First of all, we want to inform that our research's rule can be used only in individual data.

(i) Individual data (ii) Discrete data (iii) Continuous data

According to above mentioning title in individual data if we have two or more than two data, we get many differences. If we calculate standard deviation and sample standard deviation by differences of actual data, we get double data's standard deviation and sample standard deviation of actual data. We should divide by '2' in these deviations to get standard deviation and sample standard deviation of actual data.

First, we should add all differences of actual data, and then we should calculate mean of all differences, again we should add sum of actual data in mean so that we can get mean of double data. We should divide by '2' in this mean to get mean of actual data.

4. Literature Review

1) According to Prabhakar Mishra, Chandra M. Pandey, Uttam Singh, Anshul Gupta , Chinmoy Sahu and Amrit Keshri (2019), Mean is the mathematical average value of a set of data. Mean can be calculated using summation of the observations divided by number of observations.

The standard deviation is a measure of how spread out value is from its mean value.

In this definition, they defined only mean and standard deviation, but they did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of Individual data.

2) According to Allan G. Bluman (2004), Mean is the sum of the values divided by the total number of values.

The variance is the average of the square of the distance each value is from the mean.

The standard deviation is the square root of the variance.

In this definition, he defined only mean and standard deviation, but he did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of Individual data.

3) According to Arun Kumar Chaudhary (2013), the standard deviation is defined as the positive square root of the arithmetic mean of the squared deviations from their arithmetic mean of a set of values. It is also known as root mean square deviation etc.

The sum of all observation divided by the total no. of observations is called the arithmetic mean.

In this definition, he defined only mean and standard deviation, but he did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of Individual data.

4) According to Krishna P. Acharya, Bishnu Katuwal and Arun K. Yadev (2011) the selection of a group of individual or items from a population in such a way that this group represents the entire population is called a sample. Sample mean is the sum of the sample value or items divided by the total number values or items.

In this definition, they defined only sample mean but they did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of individual data etc.

5) According to Xiang Wan, Wenqian Wang, Jiming Lia and Tiejun Tang (19 Dec, 2014). The standard deviation is a measure of how spread out value is from mean.

The sample mean is the sum of the sample values divided by the total number of sample values. In this definition, they defined only mean and standard deviation, but they did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of Individual data.

6) According to ME Ed Jabou, Fernannder, Martin JA and CS, Cheutz (2017). The sum of all data divided by the total number of data is called the arithmetic mean. Deviation is the measure of the distance each value is from the mean. The standard deviation is the least value of root mean square deviation.

In this definition, they defined only mean and standard deviation, but they did not define method of calculating double data's standard deviation, sample standard deviation and mean by differences of Individual data.

5 . Research Methodology

We took individual data for our research. Our research's rule can be used only in individual data. We used qualitative method in our research. We used two or more than two persons in our research for inquiry.

Research Questions

To collect information for our research, we asked these questions with experts. The questions are given below :

1) How many differences can we get if we have two or more than two data ?

2) How do we calculate standard deviation and mean by these differences ?

6. Data interpretation and finding : Here, we take individual data, and then we calculate mean and deviation according to above mentioning titles.

x	x_1	x^2	${x_1}^2$
1	$1-5=-4$	1	16
+ 5	5 - 1 = + 4	+ 25	+ 16
$\boldsymbol{\Sigma x = 6}$	$\boldsymbol{\Sigma x_1 = 0}$	$\boldsymbol{\Sigma x^2 = 26}$	$\boldsymbol{\Sigma {x_1}^2 = 32}$

Standard Deviation of 1 and 5

Now,

$$Standard\ deviation\ (\sigma) = \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$$ According to Karl Pearson

$$= \sqrt{\frac{26}{2} - \left(\frac{6}{2}\right)^2}$$ (Where n = 2)

$$= \sqrt{13-9}$$

$$= \sqrt{4}$$

$$= 2$$

∴ Standard Deviation of 1 and 5 is 2.

Standard Deviation of -4 and +4.

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{\Sigma {x_1}^2}{n_1} - \left(\frac{\Sigma x_1}{n_1}\right)^2}$$

$$= \sqrt{\frac{32}{2} - \left(\frac{0}{2}\right)^2}$$ (Where $n_1 = 2$)

$$= \sqrt{16-0}$$

$$= \sqrt{16}$$

$$= 4$$

∴ Standard Deviation of -4 and +4 is 4.

Thus:

According to above solution, standard deviation of - 4 and + 4 is 4 which is equal to standard deviation of 2 and 10. Standard deviation of 2 and 10 is 4 . If we divide this 4 by 2, we get 2 which is equal to standard deviation of 1 and 5.

x	x_1
1	$1 - 5 = -4$
+ 5	5 - 1 = + 4
$\Sigma x = 6$	$\Sigma x_1 = 0$

Here,

According to above table sum of 1 and 5 is 6.
Mean of 1 and 5

$$\bar{X} = \frac{\Sigma X}{n} = \frac{6}{2} = 3$$

Again,

Sum of -4 and + 4 is 0
Mean of - 4 and + 4 is

$$\bar{X}_1 = \frac{0}{2} = 0$$

Now,

Method of finding mean of real data 1 and 5 from mean of - 4 and + 4
Sum of 1 and 5 is 6.
Mean of - 4 and + 4 is 0.
Mean of 2 and 10 is 6.

$$\therefore \ \bar{X} = 6 + 0 = 6$$

Mean of 1 and 5

$$\bar{X} = \frac{6+0}{2} = 3$$

$$\therefore \ \bar{X} = 3$$

∴ Mean of 1 and 5 is 3.

∴ Mean of 2 and 10 is 6.

x	x_1	x^2	${x_1}^2$
3	$3 - 4 = -1$	9	1
+ 4	4 - 3 = + 1	+ 16	+ 1
$\boldsymbol{\Sigma x = 7}$	$\boldsymbol{\Sigma x_1 = 0}$	$\boldsymbol{\Sigma x^2 = 25}$	$\boldsymbol{\Sigma {x_1}^2 = 2}$

Standard Deviation of 3 and 4
Now,

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

$$= \sqrt{\frac{25}{2} - \left(\frac{7}{2}\right)^2} \qquad \text{(Where n = 2)}$$

$$= \sqrt{12.5 - 12.25}$$

$$= \sqrt{0.25}$$

$$= 0.50$$

∴ Standard Deviation of 3 and 4 is 0.50.

Again,

Standard Deviation of -1 and +1.

$$\sigma = \sqrt{\frac{\Sigma {x_1}^2}{n_1} - \left(\frac{\Sigma x_1}{n_1}\right)^2}$$

$$= \sqrt{\frac{2}{2} - \left(\frac{0}{2}\right)^2} \qquad \text{(Where } n_1 = 2\text{)}$$

$$= \sqrt{1 - 0}$$

$$= \sqrt{1}$$

$$= 1$$

∴ Standard Deviation of -1 and +1 is 1.

Thus :

According to above solution, standard deviation of - 1 and + 1 is 1. Which is equal to standard deviation of 6 and 8. Standard deviation of 6 and 8 is 1 etc. If we divide this 1 by 2, we get 0.5 which is equal to standard deviation of 3 and 4 etc.

x	x_1
3	$3 - 4 = -1$
+ 4	4 - 3 = + 1
$\boldsymbol{\Sigma x = 7}$	$\boldsymbol{\Sigma x_1 = 0}$

Here,

According to above table sum of 3 and 4 is 7.
Mean of 3 and 4

$$\bar{X} = \frac{3+4}{2} = 3.5$$

Again,

According to above table sum of -1 and + 1 is 0.
Mean of - 1 and + 1

$$\bar{X}_1 = \frac{0}{2} = 0$$

Now,

Method of finding mean of actual data 3 and 4 from mean of - 1 and + 1
Sum of 3 and 4 is 7.
Mean of - 1 and + 1 is 0.
Mean of 6 and 8

$$\therefore\ \bar{X} = 7 + 0 = 7$$

Mean of 3 and 4

$$\bar{X} = \frac{7 + \frac{0}{2}}{2} = \frac{7+0}{2} = 3.5$$

$$\therefore\ \bar{X} = 3.50$$

∴ Mean of 3 and 4 is 3.50

$\frac{x}{3}$	$\frac{x_1}{3-(4+7) = -8}$	$\frac{x^2}{9}$	$\frac{{x_1}^2}{64}$
4	4 - (3 + 7) = - 6	16	36
+ 7	7 - (3 + 4) = 0	+ 49	+ 0
$\boldsymbol{\Sigma x = 14}$	$\boldsymbol{\Sigma x_1 = -14}$	**74**	$\boldsymbol{\Sigma {x_1}^2 = 100}$

Standard Deviation of 3, 4 and 7

Now,

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

$$= \sqrt{\frac{74}{3} - \left(\frac{14}{3}\right)^2} \qquad \text{(Where n = 3)}$$

$$= \sqrt{24.6667 - (4.66)^2}$$

$$= \sqrt{24.667 - 21.778}$$

$$= \sqrt{2.8889}$$

$$\sigma = 1.699673174$$

∴ Standard Deviation of 3, 4 and 7 is 1.699673174

Now Again,

Standard Deviation of -8, -6 and 0.

$$\sigma = \sqrt{\frac{\Sigma x_1{}^2}{n_1} - \left(\frac{\Sigma x_1}{n_1}\right)^2}$$

$$= \sqrt{\frac{100}{3} - \left(\frac{-14}{3}\right)^2}$$

$$= \sqrt{33.3333 - (-4.66)^2}$$

$$= \sqrt{33.33 - 21.778}$$

$$= \sqrt{11.5558}$$

$$\sigma = 3.3993$$

∴ Standard Deviation of -8, -6 and 0 is 3.3993

Thus :

According to above solution, standard deviation of -8, -6 and 0 is 3.3993. Which is equal to standard deviation of 6, 8 and 14 etc. Standard deviation of 6, 8 and 14 is 3.3993. If we divide this 3.3993 by 2, we get 1.699673174 which is equal to standard deviation of 3, 4 and 7.

x	x_1
3	$3-(4+7) = -8$
4	4 - (3 + 7) = - 6
+ 7	7 - (3 + 4) = 0
$\boldsymbol{\Sigma x = 14}$	$\boldsymbol{\Sigma x_1 = -14}$

Here,

According to above table sum of 3, 4 and 7 is 14.
Mean of 3, 4 and 7

$$\bar{X} = \frac{14}{3} = 4.66667$$

Again,

According to above table sum of -8, - 6 and 0 is - 14.
Mean of - 8, -6 and 0

$$\bar{X}_1 = \frac{-14}{3} = -4.6667$$

Now,

Method of finding mean of actual data 3, 4 and 7 from mean of - 8, - 6 and 0
Sum of 3, 4 and 7 is 14.
Mean of - 8, -6 and 0 is -4.667.
Mean of 6, 8 and 14

$$\therefore \ \bar{X} = 14 + (-4.667) = 9.33$$

Mean of 3, 4 and 7

$$\bar{X} = \frac{14+(-4.667)}{2} = \frac{9.33}{2} = 4.667$$

$\therefore \ \overline{X} = 4.667$

x	x_1	x^2	${x_1}^2$
3	$3 - (8 + 12) = -17$	9	289
8	8 - (3 + 12) = - 7	64	49
+ 12	12 - (3 + 8) = +1	+ 144	+ 1
$\Sigma x = 23$	$\Sigma x_1 = -23$	$\Sigma x^2 = 217$	$\Sigma {x_1}^2 = 339$

Standard Deviation of 3, 8 and 12

Now,

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

$$= \sqrt{\frac{217}{3} - \left(\frac{23}{3}\right)^2} \qquad \text{(Where n = 3)}$$

$$= \sqrt{72.3333 - (7.666)^2}$$

$$= \sqrt{72.3333 - 58.777}$$

$$= \sqrt{13.5556}$$

$$\sigma = 3.681$$

$\therefore$ Standard Deviation of 3, 8 and 12 is3.681

Now Again,

Standard Deviation of -17, -7 and +1.

$$\sigma = \sqrt{\frac{\Sigma {x_1}^2}{n_1} - \left(\frac{\Sigma x_1}{n_1}\right)^2}$$

$$= \sqrt{\frac{339}{3} - \left(\frac{-23}{3}\right)^2} \qquad \text{(Where } n_1 = 3\text{)}$$

$$= \sqrt{113 - 58.777}$$

$$= \sqrt{54.223}$$

$$\sigma = 7.3635$$

$\therefore$ Standard Deviation of -17, -7 and +1 is 7.3635.

Thus :

According to above solution, standard deviation of -17, -7 and +1 is 7.3635. Which is equal to standard deviation of 6, 16 and 24 etc. Standard deviation of 6, 16 and 24 is 7.3635. If we divide this 7.3635 by 2, we get 3.681 which is equal to standard deviation of 3, 8 and 12 etc.

x	x_1
3	$3-(8+12) = 3-20 = -17$
8	8 - (3 + 12) = 8 - 15 = - 7
+ 12	12 - (3 + 8) = 12 - 11 = + 1
$\Sigma x = 23$	$\Sigma x_1 = -23$

Here,

According to above table sum of 3, 8 and 12 is 23.
Mean of 3, 8 and 12

$$\bar{X} = \frac{23}{3} = 7.6667$$

Again,

According to above table sum of -17, - 7 and +1 is -23.
Mean of -17, -7 and +1

$$\bar{X}_1 = \frac{-23}{3} = -7.6667$$

Now,

Method of finding mean of actual data 3, 8 and 12 from mean of -17, -7 and +1
Sum of 3, 8 and 12 is 23.
Mean of - 17, -7 and +1 is -7.6667.
Mean of 6, 16 and 24

$$\therefore\ \bar{X} = 23 + (-7.667) = 15.333$$

Mean of 3, 8 and 12

$$\bar{X} = \frac{23 + (-7.667)}{2} = \frac{15.3333}{2} = 7.667$$

$$\therefore\ \bar{X} = 7.667$$

Sample Standard Deviation

x	x_1	x^2	${x_1}^2$
1	$1-5 = -4$	1	16
+ 5	5 - 1 = + 4	+ 25	+ 16
$\boldsymbol{\Sigma x = 6}$	$\boldsymbol{\Sigma x_1 = 0}$	$\boldsymbol{\Sigma x^2 = 26}$	$\boldsymbol{\Sigma {x_1}^2 = 32}$

Sample Standard Deviation of 1 and 5

Now,

$$S.S.D = \sqrt{\frac{1}{n-1} \times \left(\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right)}$$

$$= \sqrt{\frac{1}{2-1} \times \left(26 - \frac{(6)^2}{2}\right)} \qquad \text{(Where n = 2)}$$

$$= \sqrt{\frac{1}{1} \times \left(\frac{52-36}{2}\right)}$$

$$= \sqrt{\frac{16}{2}}$$

$$= \sqrt{8}$$

$$S.S.D = 2.82$$

∴ Sample Standard Deviation of 1 and 5 is 2.82.

Again,

Sample Standard Deviation of -4 and +4.

$$S.S.D = \sqrt{\frac{1}{n_1 - 1} \times \left(\Sigma {x_1}^2 - \frac{(\Sigma x_1)^2}{n_1}\right)}$$

$$= \sqrt{\frac{1}{2-1} \times \left(32 - \frac{(0)^2}{2}\right)} \qquad \text{(Where } n_1 = 2\text{)}$$

$$= \sqrt{\frac{1}{1} \times (32 - 0)}$$

$$= \sqrt{32}$$

$$S.S.D = 5.65$$

∴ Sample Standard Deviation of -4 and +4 is 5.65

Thus :

According to above solution, sample standard deviation of -4 and +4 is 5.65. Which is equal to sample standard deviation of 2 and 10. Sample standard deviation of 2 and 10 is 5.65 etc. If we divide this 5.65 by 2, we get 2.82 which is equal to sample standard deviation of 1 and 5.

X	x_1	x^2	${x_1}^2$
3	3-4= -1	9	1
4	4-3 = 1	+16	+1
$\boldsymbol{\Sigma x = 7}$	$\boldsymbol{\Sigma x_1 = 0}$	$\boldsymbol{\Sigma x^2 = 25}$	$\boldsymbol{\Sigma {x_1}^2 = 2}$

Sample Standard Deviation of 3 and 4

Now,

$$S.S.D = \sqrt{\frac{1}{n-1} \times \left(\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right)}$$

$$= \sqrt{\frac{1}{2-1} \times \left(25 - \frac{(7)^2}{2}\right)} \qquad \text{(Where n = 2)}$$

$$= \sqrt{\frac{1}{1} \times \left(25 - \frac{49}{2}\right)}$$

$$= \sqrt{\frac{1}{1} \times \left(\frac{50-49}{2}\right)}$$

$$= \sqrt{\frac{1}{2}}$$

$$S.S.D = 0.70710$$

∴ Sample Standard Deviation of 3 and 4 is 0.70710

Again,

Sample Standard Deviation of -1 and +1.

Now,

$$S.S.D = \sqrt{\frac{1}{n_1-1} \times \left(\Sigma {x_1}^2 - \frac{(\Sigma x_1)^2}{n_1}\right)}$$

$$= \sqrt{\frac{1}{2-1} \times \left(2 - \frac{(0)^2}{2}\right)} \qquad \text{(Where } n_1 = 2\text{)}$$

$$= \sqrt{\frac{1}{1} \times 2}$$

$$= \sqrt{2}$$

$$S.S.D = 1.41421$$

∴ Sample Standard Deviation of -1 and +1 is 1.4121.

Thus :

According to above solution, sample standard deviation of -1 and +1 is 1.4121. Which is equal to sample standard deviation of 6 and 8. Sample standard deviation of 6 and 8 is 1.41421 etc. If we divide this 1.41421 by 2, we get 0.70710 which is equal to sample standard deviation of 3 and 4.

$\frac{x}{3}$	$\frac{x_1}{3-(4+7) = 3 - 11 = -8}$	$\frac{x^2}{9}$	$\frac{{x_1}^2}{64}$
4	4 - (3 + 7) = 4 - 10 = -6	16	36
+ 7	7 - (3 + 4) = 7 - 7 = 0	49	+ 0
$\Sigma x = 14$	$\Sigma x_1 = -14$	$\Sigma x^2 = 74$	$\Sigma {x_1}^2 = 100$

Sample Standard Deviation of 3, 4 and 7

Now,

$$\sigma = \sqrt{\frac{1}{n-1} \times \left(\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right)}$$

$$= \sqrt{\frac{1}{3-1} \times \left(74 - \frac{(14)^2}{3}\right)} \qquad \text{(Where n = 3)}$$

$$= \sqrt{\frac{1}{2} \times \left(74 - \frac{196}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \left(\frac{222-196}{3}\right)}$$

$$= \sqrt{\frac{26}{6}}$$

$$= \sqrt{4.333}$$

$$S.S.D. = 2.0816$$

∴ Sample Standard Deviation of 3, 4 and 7 is 2.0816

Now Again,

Sample Standard Deviation of -8, -6 and o is.

$$\sigma = \sqrt{\frac{1}{3-1} \times \left(100 - \frac{(-14)^2}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \left(100 - \frac{196}{3}\right)} \qquad \text{(Where } n_1 = 3\text{)}$$

$$= \sqrt{\frac{1}{2} \times \left(\frac{300-\ 196}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \frac{104}{3}}$$

$$= \sqrt{17.3333}$$

$$S.S.D. = 4.1633333$$

∴ Sample Standard Deviation of - 8, - 6 and 0 is 4.1633333.

Thus :

According to above solution, sample standard deviation of -8, -6 and -0 is 4.16333. Which is equal to sample standard deviation of 6, 8 and 14. Sample standard deviation of 6, 8 and 14 is 4.16333 etc. If we divide this 4.163333 by 2, we get 2.0816 which is equal to sample standard deviation of 3, 4 and 7.

$\frac{x}{3}$	$\frac{x_1}{3-(8+12) = 3 - 20 = -17}$	$\frac{x^2}{9}$	$\frac{{x_1}^2}{289}$
8	8 - (3 + 12) = 8 - 15 = -7	64	49
+ 12	12 - (3 + 8) = 12 - 11 = + 1	+ 144	+ 1
$\boldsymbol{\Sigma x = 23}$	$\boldsymbol{\Sigma x_1 = -23}$	$\boldsymbol{\Sigma x^2 = 217}$	$\boldsymbol{\Sigma {x_1}^2 = 339}$

Sample Standard Deviation of 3, 8 and 12

Now,

$$S.S.D. = \sqrt{\frac{1}{n-1} \times \left(\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right)}$$

$$= \sqrt{\frac{1}{3-1} \times \left(217 - \frac{(23)^2}{3}\right)} \qquad \text{(Where n = 3)}$$

$$= \sqrt{\frac{1}{2} \times \left(217 - \frac{529}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \left(\frac{651-529}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \frac{122}{3}}$$

$$= \sqrt{\frac{122}{6}}$$

$$= \sqrt{20.3333}$$

$$S.S.D. = 4.51$$

∴ Sample Standard Deviation of 3, 8 and 12 is 4.51.

Now Again,

Sample Standard Deviation of -8, -6 and o is.

$$S.S.D. = \sqrt{\frac{1}{n_1 - 1} \times \left(\Sigma {x_1}^2 - \frac{(\Sigma x_1)^2}{n_1}\right)}$$

$$\sigma = \sqrt{\frac{1}{3-1} \times \left(339 - \frac{(-23)^2}{3}\right)}$$ (Where $n_1 = 3$)

$$= \sqrt{\frac{1}{2} \times \left(\frac{339 \times 3 - 529}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \left(\frac{1017 - 529}{3}\right)}$$

$$= \sqrt{\frac{1}{2} \times \frac{488}{3}}$$

$$= \sqrt{\frac{488}{6}}$$

$$= \sqrt{81.3333}$$

$$S.S.D. = 9.0185$$

∴ Sample Standard Deviation of - 17, - 7 and + 1 is 9.0185.

Thus :

According to above solution, sample standard deviation of -17, -7 and +1 is 9.0185. Which is equal to sample standard deviation of 6, 16 and 24. Sample standard deviation of 6, 16 and 24 is 9.0185 etc. If we divide this 9.0185 by 2, we get 4.51 which is equal to sample standard deviation of 3, 8 and 12.

$\frac{x}{3}$

Suppose Assume Data = 4.

$\frac{x}{3}$	$\frac{x_1}{3 - 4 = -1}$	$\frac{x^2}{9}$	$\frac{{x_1}^2}{1}$
$\boldsymbol{\Sigma x = 3}$	$\boldsymbol{\Sigma x_1 = -1}$	$\boldsymbol{\Sigma x^2 = 9}$	$\boldsymbol{\Sigma {x_1}^2 = 1}$

Now,

Standard Deviation of 3

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

$$= \sqrt{\frac{9}{1} - \left(\frac{3}{1}\right)^2}$$ (Where n = 1)

$$= \sqrt{9 - 9}$$

$$\sigma = 0$$

∴ Sample Standard Deviation of 3 is 0.

Standard deviation of -1

$$\sigma = \sqrt{\frac{\Sigma x_1{}^2}{n_1} - \left(\frac{\Sigma x_1}{n_1}\right)^2}$$

$$= \sqrt{\frac{1}{1} - \left(\frac{-1}{1}\right)^2} \qquad \text{(Where } n_1 = 1\text{)}$$

$$= \sqrt{1 - 1}$$

$$= \sqrt{0}$$

$$= 0$$

∴ Standard Deviation of -1 is 0.

$\frac{x}{3}$

Assume Data = 4.

$\frac{x}{3}$	$\frac{x_1}{3 - 4 = -1}$
$\boldsymbol{\Sigma x = 3}$	$\boldsymbol{\Sigma x_1 = -1}$

Here,
According to above table sum of 3 and 4 is 7.
Mean of 3

$$\bar{X} = \frac{3}{1} = 3$$

Again,
According to above table sum of -1, is -1.
Mean of -1

$$\bar{X}_1 = \frac{-1}{1} = -1$$

Now,
Method of finding mean of actual data 3 from mean of -1.
Sum of 3 is 3.
Mean of -1 is -1.
Mean of 6

$$\bar{X} = \frac{3\text{ (Actual Data)} + 4\text{ (Assume Data)} + (-1)}{1}$$

$$\bar{X} = \frac{7-1}{1} = \frac{6}{1} = 6$$

Mean of 3

$$\bar{X} = \frac{3 + 4 + (-1)}{2} = \frac{7-1}{2} = \frac{6}{2} = 3$$

1. Sum of deviations is always zero if we take deviations by actual mean.

For Example,

x	$x = x - \bar{X}$
3	-5
5	-3
8	0
10	+2
+14	+6
$\boldsymbol{\Sigma x = 40}$	$\boldsymbol{\Sigma x = 0}$

$$Actual\ Mean\ (\overline{X}) = \frac{40}{5} = 8$$

2. Sum of deviations is never zero if we take deviations by assume mean.

Assume Mean = 10

x	$d = X - A$
3	-7
5	-5
8	-2
10	0
+14	+4
$\boldsymbol{\Sigma x = 40}$	$\boldsymbol{\Sigma d = -10}$

3. If assume mean equals actual mean, sum of deviations will always be zero.

For Example

A = 8

x	$d = X - A$
3	-5
5	-3
8	0
10	2
+14	+6
$\boldsymbol{\Sigma x = 40}$	$\boldsymbol{\Sigma d = 0}$

7. Conclusions:

Above in individual data if we have two or more than two data, we get many differences. If we calculate standard deviation and sample standard deviation by differences of actual data, we get double data's standard deviation and sample standard deviation of actual data. We should divide by '2' in these deviation to get standard deviation and sample standard deviation of actual data.

First, we should add all differences of actual data, and then we should calculate mean of all differences, again we should add sum of actual data in mean so that we can get mean of double data. We should divide by '2' in this mean to get mean of actual data.

8. Way Forward

At last, we want to inform that above mentioning conclusions are useful to statistician, mathematician, students and people who are interested in both mathematics and statistics etc.

Useful to statistician, mathematician, students and people: They can know how to calculate double data's standard deviation, sample standard deviation and mean by differences of actual data after studying this research article.

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