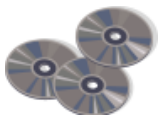


Standard Deviation





Standard deviation can be used to represent the variation in a set of data.



It takes into account how far away each data value is from the mean.



If there is "**LITTLE**" variation between the data and the mean, then the standard deviation will be "**LOW**".



If there is "**A LOT**" of variation between the data and the mean, then the standard deviation will be "**HIGH**".

How to Calculate the Standard Deviation:

1. Calculate the mean.
2. Construct the following chart:

<u>Data Value</u>	<u>Deviation</u> (Mean-Data Value)	<u>Squared Deviation</u>

3. Find the sum of the "Squared Deviation" column and divide it by the number of data. (Find the mean of the squared deviation.)
4. Find the square root of step 3.

EXAMPLE

Calculate the Standard Deviation.

Data:

24	31	22	29	33
42	21	43	35	

1. Calculate the mean.

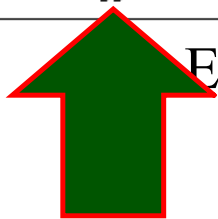
$$\frac{24 + 31 + 22 + 29 + 33 + 42 + 21 + 43 + 35}{9}$$

$$\frac{280}{9}$$

$$31.1$$

2. Construct the following chart:

Data	Deviation	Squared Deviation
24		
31		
22		
29		
33		
42		
21		
43		
35		

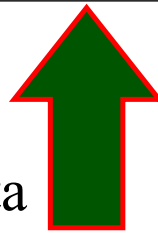


Enter the data

2. Construct the following chart:

Data	Deviation	Squared Deviation
24	$31.1 - 24 = 7.1$	
31	$31.1 - 31 = 0.1$	
22	$31.1 - 22 = 9.1$	
29	$31.1 - 29 = 2.1$	
33	$31.1 - 33 = 1.9$	
42	$31.1 - 42 = -10.9$	
21	$31.1 - 21 = 10.1$	
43	$31.1 - 43 = 11.9$	
35	$31.1 - 35 = -3.9$	

Deviation = Mean - Data



2. Construct the following chart:

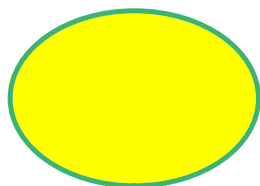
Data	Deviation	Squared Deviation
24	$31.1 - 24 = 7.1$	50.41
31	$31.1 - 31 = 0.1$	0.01
22	$31.1 - 22 = 9.1$	82.81
29	$31.1 - 29 = 2.1$	4.41
33	$31.1 - 33 = 1.9$	3.61
42	$31.1 - 42 = -10.9$	118.81
21	$31.1 - 21 = 10.1$	102.01
43	$31.1 - 43 = 11.9$	141.61
35	$31.1 - 35 = -3.9$	15.21



$(\text{Deviation})^2$

3. Find the sum of the "Squared Deviation" column and divide it by the number of data. (Find the **mean** of the **squared deviation**.)

Data	Deviation	Squared Deviation
24	$31.1 - 24 = 7.1$	50.41
31	$31.1 - 31 = 0.1$	0.01
22	$31.1 - 22 = 9.1$	82.81
29	$31.1 - 29 = 2.1$	4.41
33	$31.1 - 33 = 1.9$	3.61
42	$31.1 - 42 = -10.9$	118.81
21	$31.1 - 21 = 10.1$	102.01
43	$31.1 - 43 = 11.9$	141.61
35	$31.1 - 35 = -3.9$	15.21



518.89

Total

3. Find the sum of the "Squared Deviation" column and divide it by the number of data. (Find the mean of the squared deviation.)

Data	Deviation	Squared Deviation
24	$31.1 - 24 = 7.1$	50.41
31	$31.1 - 31 = 0.1$	0.01
22	$31.1 - 22 = 9.1$	82.81
29	$31.1 - 29 = 2.1$	4.41
33	$31.1 - 33 = 1.9$	3.61
42	$31.1 - 42 = -10.9$	118.81
21	$31.1 - 21 = 10.1$	102.01
43	$31.1 - 43 = 11.9$	141.61
35	$31.1 - 35 = -3.9$	15.21

518.89



518.89

9

57.65

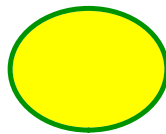


4. Find the square root of step 3.

$$\sqrt{57.65}$$

The standard deviation is

7.59



You try!

Calculate the
Standard Deviation.

Data	Deviation	Squared Deviation
2.28		
2.46		
3.25		
4.25		
10.2		
13.5		
14.4		
21.2		
21.7		



Data	Deviation	Squared Deviation
2.28	$10.36 - 2.28 = 8.08$	65.29
2.46	$10.36 - 2.46 = 7.9$	62.41
3.25	$10.36 - 3.25 = 7.11$	50.55
4.25	6.11	37.33
10.2	0.16	0.03
13.5	-3.14	9.86
14.4	-4.04	16.32
21.2	-10.84	117.51
21.7	-11.34	128.60

487.9

487.9

9

54.21

$\sqrt{54.21}$

7.36

