

Demonstrating the Calculation of the Standard Deviation for a Sample

Demonstrate using the formula:
$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$$

Given the follow in data set: x: 1, 3, 4, 6, 11

Step 1

enter the data into L1

L1	L2	L3	1
1			
3			
4			
6			
11			

L1(6)=

Step 2

calculate \bar{x}

→

1-Var Stats
$\bar{x}=5$
$\sum x=25$
$\sum x^2=183$
$Sx=3.807886553$
$\sigma x=3.405877273$
$n=5$

Step 3

put cursor on L2

L1	L2	L3	2
1			
3			
4			
6			
11			

L2 =

Step 3 continued

enter L1 - \bar{x}

L1	L2	L3	2
1			
3			
4			
6			
11			

L2 = L1 - \bar{x}

press [Enter]

L1	L2	L3	2
1	-4		
3	-2		
4	-1		
6	1		
11	6		

L2(1) = -4

Step 4

put cursor on L3

L1	L2	L3	3
1	-4		
3	-2		
4	-1		
6	1		
11	6		

L3 = L2 \square

and enter L2 and square ($L2^2$)
the square key is above [LOG]

for \bar{x} goto [VARS]

5:Statistics...	2: \bar{x}
VARs ψ -VARs	Σ EQ TEST PTS
1:Window...	1:n
2:Zoom...	2: Σx
3:GDB...	3: Σx^2
4:Picture...	4:q \bar{x}
5:Statistics...	5:q σx
6:Table...	6:q σw
7:String...	7:q σw

Step 4 continued

push [ENTER]

now we have $(x - \bar{x})^2$

L1	L2	L3	3
1	-4	16	
3	-2	4	
4	-1	1	
6	1	1	
11	6	36	

L3(1)=16

Step 5

Quit Edit to Main Screen

2nd [LIST] >> MATH

5:Sum(

NAMES	OPS	MATH
1:min(
2:max(
3:mean(
4:median(
5:sum(
6:prod(
7:stdDev(

[ENTER] for the sum

sum(L3)	58
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Step 6

plug numbers into formula & show

$$s = \sqrt{\frac{58}{4}} \approx 3.8$$