



Day 1: Standard Deviation ☆

2 more challenges to get your next star!

Points: 3/5



Problem

Submissions

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Editorial

Tutorial

Objective

In this challenge, we practice calculating *standard deviation*. Check out the *Tutorial* tab for learning materials and an instructional video!

Task

Given an array, X , of N integers, calculate and print the standard deviation. Your answer should be in decimal form, rounded to a scale of **1** decimal place (i.e., **12.3** format). An error margin of ± 0.1 will be tolerated for the standard deviation.

Input Format

The first line contains an integer, N , denoting the number of elements in the array.

The second line contains N space-separated integers describing the respective elements of the array.

Constraints

- $5 \leq N \leq 100$
- $0 < x_i \leq 10^5$, where x_i is the i^{th} element of array X .

Output Format

Print the *standard deviation* on a new line, rounded to a scale of **1** decimal place (i.e., **12.3** format).

Sample Input

```
5
10 40 30 50 20
```

Sample Output

```
14.1
```

Explanation

First, we find the *mean*:

$$\mu = \frac{\sum_{i=0}^{N-1} x_i}{N} = 30.0$$

Next, we calculate the squared distance from the mean, $(x_i - \mu)^2$, for each x_i :

1. $(x_0 - \mu)^2 = (10 - 30)^2 = 400$
2. $(x_1 - \mu)^2 = (40 - 30)^2 = 100$
3. $(x_2 - \mu)^2 = (30 - 30)^2 = 0$
4. $(x_3 - \mu)^2 = (50 - 30)^2 = 400$
5. $(x_4 - \mu)^2 = (20 - 30)^2 = 100$



Now we can compute $\sum_{i=0}^{N-1} (x_i - \mu)^2 = 400 + 100 + 0 + 400 + 100 = 1000$, so:

$$\sigma = \sqrt{\frac{\sum_{i=0}^{N-1} (x_i - \mu)^2}{N}} = \sqrt{\frac{1000}{5}} = \sqrt{200} = 14.1421356$$

Once rounded to a scale of **1** decimal place, our result is **14.1**.

Python 3



```
1 # Enter your code here. Read input from STDIN. Print output to STDOUT
2
3 size = int(input())
4 numbers = list(map(int, input().split()))
5
6 mean = sum(numbers)//size
7 standard_deviation= sum([(a - mean) ** 2) for a in numbers])/size
8 print(round(standard_deviation ** 0.5,1))
```

Line: 7 Col: 67

[Upload Code as File](#)
☐ Test against custom input

Run Code

Submit Code

You have earned 30.00 points!

You are now 2 challenges away from the 2nd star for your 10 days of statistics badge.

0%

3/5



Congratulations

You solved this challenge. Would you like to challenge your friends?



Next Challenge

Test case 0

Compiler Message