## Variance of 1D datasets

5/5 points (100.00%)

Quiz, 5 questions

# **✓** Congratulations! You passed!

Next Item



1/1 points

1.

What is the variance of the following dataset?

$$\mathcal{D}=\{1,2,3,2\}$$

Please use decimal numbers in your answer.

0.5

### **Correct Response**

Well done!



5/5 points (100.00%)

Quiz, 5 questions

2.

What is the standard deviation of the dataset  $\mathcal{D}=\{1,2,3,2\}$  which we already used in the previous question? You should provide a decimal number as your answer.

0.707

#### **Correct Response**

Indeed: You just needed to take the square-root of the variance.



1/1 points

3.

What would be the new variance if we added 1 to each element in the dataset  $\mathcal{D}=\{1,2,3,2\}$  from Question 1? Please use decimal numbers in your answer.

0.5

#### **Correct Response**

Yes: adding a constant to the dataset does not change its variance.

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5/5 points (100.00%)

Quiz, 5 questions

4.

What would be the new variance if we multiplied each sample in a dataset  ${\cal D}$  by 2.

The variance of the new dataset will be four times the variance of  $\mathcal{D}$ .

#### Correct

Well done!

- The variance of the new dataset will be two times the variance of  $\mathcal{D}$ .
- The variance of the new dataset will not change.



1/1 points

5.

Assuming we have mean  $\bar{x}_{n-1}$  and variance  $\sigma_{n-1}^2$  for some dataset  $\mathcal{D}_{n-1}$  with n-1 samples. What would be the variance  $\sigma_n^2$  if we add a new element  $x_*$  to the dataset (assuming you have computed the new sample mean  $\bar{x}_n$ )?

$$\bigcirc$$

$$\sigma_n^2 = rac{n-1}{n} \sigma_{n-1}^2 + rac{1}{n} (x_* - ar{x}_{n-1}) (x_* - ar{x}_n)$$

#### Correct

Great job!

$$\int \sigma_n^2 = rac{n-1}{n} \sigma_{n-1}^2 + rac{1}{n-1} (x_* - ar{x}_{n-1}) (x_* - ar{x}_n)$$

$$\sigma_n^2 = rac{n-1}{n} \sigma_{n-1}^2 + rac{1}{n} (x_* - ar{x}_{n-1})^2$$

$$\int \sigma_n^2 = rac{n-2}{n-1} \sigma_{n-1}^2 + rac{1}{n} (x_* - ar{x}_{n-1}) (x_* - ar{x}_n)$$

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