

# Variance of 1D datasets

LATEST SUBMISSION GRADE

100%

1. What is the variance of the following dataset?

1 / 1 point

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

Please use decimal numbers in your answer.

0.5



Correct

Well done!

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.

1 / 1 point

0.707



Correct

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

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.

1 / 1 point

0.5



Correct

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



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

1 / 1 point

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

✓ **Correct**  
Well done!

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  $\bar{x}_n$ )?

1 / 1 point

- ☐  $\sigma_n^2 = \frac{n-1}{n} \sigma_{n-1}^2 + \frac{1}{n} (x_* - \bar{x}_{n-1})^2$
- ☒  $\sigma_n^2 = \frac{n-1}{n} \sigma_{n-1}^2 + \frac{1}{n} (x_* - \bar{x}_{n-1})(x_* - \bar{x}_n)$
- ☐  $\sigma_n^2 = \frac{n-2}{n-1} \sigma_{n-1}^2 + \frac{1}{n} (x_* - \bar{x}_{n-1})(x_* - \bar{x}_n)$
- ☐  $\sigma_n^2 = \frac{n-1}{n} \sigma_{n-1}^2 + \frac{1}{n-1} (x_* - \bar{x}_{n-1})(x_* - \bar{x}_n)$

✓ **Correct**  
Great job!