

# Variance of 1D datasets

## 1.Question 1

What is the variance of the following dataset?

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

Please use decimal numbers in your answer.

1 / 1 point

0.5

## 2.Question 2

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

1 / 1 point

0.707

## 3.Question 3

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

1 / 1 point

0.5

## 4.Question 4

What would be the new variance if we multiplied each sample in a dataset  $D$  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  $D$ .



The variance of the new dataset will be four times the variance of  $D$ .

## 5.Question 5

Assuming we have mean  $\bar{x}_{n-1}$  and variance  $\sigma_{n-1}^2$  for some dataset  $D_{n-1}$  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



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



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



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

$$\sigma_{n2} = n-1n-2\sigma_{n-12} + n1(x^*_n - x^{*-}_{n-1})(x^*_n - x^{*-}_n)$$