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**

   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 be two times the variance of $\mathcal{D}$.

   ○ The variance of the new dataset will not change.

   ⊙ 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 σ_{n-1}^2 for some dataset $\mathcal{D}_{n-1}$ with $n - 1$ samples. What would be the variance σ_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

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

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

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

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

   ✓ **Correct**

   Great job!