✓ **Congratulations! You passed!**

| Grade | Latest Submission | To pass 80% or | |
|---|---|---|---|
| received 100% | Grade 100% | higher | **Go to next item** |

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**1.** What is the variance of the following dataset?

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

Please use decimal numbers in your answer.

| 0.5 |
|---|

1 / 1 point

✓ **Correct**
Well done!

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**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 |
|---|

1 / 1 point

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

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**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 |
|---|

1 / 1 point

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

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

○ 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 $\mathcal{D}$.

1 / 1 point

✓ **Correct**
Well done!

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**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 $\bar{x}_n$) ?

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

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

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

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

1 / 1 point

✓ **Correct**
Great job!