## Congratulations! You passed!

Grade received 100% To pass 80% or higher

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**1.** 1 / 1 point

| Set | Values | | | |
|---|---|---|---|---|
| 1 | 1 | 5 | 7 | 9 |
| 2 | −20 | −10 | 0 | 10 |
| 3 | 100 | 101 | 102 | 103 |
| 4 | −10 | −5 | 0 | −5 |

Consider the four sets of samples above. Which one has the smallest **variance?**

- ○ 1
- ○ 2
- ◉ 3
- ○ 4

**Correct**
Correct! The variance measures how much a sample is spread. We can easily look at all the samples and check that this one has the smallest spread among all.

**2.** About the **mean, mode** and **median,** it is correct to say (check all that apply). 1 / 1 point

- ☐ The mean is always greater than or equal to the median.
- ☑ The median is more stable to outliers than the mean.

**Correct**
Correct! Since the median is a **positional** measure, it is more stable to extreme values!

- ☑ The mode is the most frequent value in a sample.

**Correct**
Correct! This is precisely the definition of mode!

- ☑ There can be more than one mode in a sample.

**Correct**
Correct! The most frequent value might not be unique. For instance, in the samlpe $\{1, 1, 2, 2, 3, 4\}$, the modes are $1$ and $2$. Distributions which there are more than one mode are called **multimodal distributions!**

**3.** Consider the following **independent** random variables: 1 / 1 point

$$X \sim \text{Normal}(3, 1^2)$$
$$Y \sim \text{Normal}(2, 2^2)$$

Then $Z = X + Y \sim \text{Normal}(\mu, \sigma^2)$, where $\mu, \sigma$ are equal to:

- ○ $\mu = \sqrt{5}, \sigma = \sqrt{3}$
- ◉ $\mu = 5, \sigma = \sqrt{5}$
- ○ $\mu = 5, \sigma = \sqrt{3}$
- ○ $\mu = 5, \sigma = 5$

**Correct**
Correct! Using the formula $\mu_Z = \mu_X + \mu_Y$ and $\sigma_Z = \sqrt{\sigma_X^2 + \sigma_Y^2}$ you get the result!

**4.** What is the advantage of looking at the standard deviation instead of the variance? 1 / 1 point

- ○ The standard deviation is less affected by outliers than the variance.
- ◉ The standard deviation has the same dimension as the sample.
- ○ The standard deviation may be negative.

- ○ There are no advantages. They mean the same thing.

**Correct**
Correct! The variance has the sample's dimension squared, whereas the standard deviation has the same dimension as the sample. This makes it easier to interpret.

**5.** Which of the following best describes the purpose of a QQ plot? **1 / 1 point**

- ○ To visualize the distribution of a dataset
- ○ To visualize the relationship between two datasets
- ◉ To test for normality of a dataset
- ○ To test for independence between two datasets

**Correct**
Correct! The main purpose of a QQ plot is to test for normality of a dataset.

**6.** Which of the following is true about a box plot with a long whisker on the upper end? **1 / 1 point**

- ○ The data is negatively skewed
- ◉ The data is positively skewed
- ○ The data is normally distributed
- ○ There are no outliers

**Correct**
Correct! A box plot with a long whisker on the upper end is an indication of positively skewed data.

**7.** Which of the following is a correct statement regarding a QQ plot? **1 / 1 point**

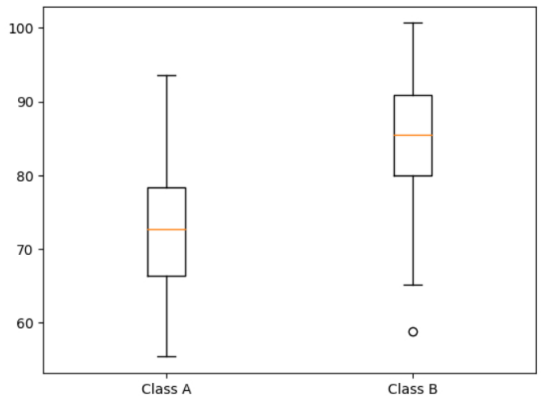
- ☐ If the points fall close to the diagonal, the data is not normally distributed
- ☑ If the points fall close to the diagonal line, the data is normally distributed

**Correct**
Correct! If the points fall close to the diagonal line, it indicates that the data is normally distributed.

- ☐ If the points fall far from the diagonal line, the data is normally distributed
- ☑ If the points fall far from the diagonal line, the data is not normally distributed

**Correct**
Correct! If the points fall far from the diagonal line, it indicates that the data is not normally distributed.

**8.** Consider the following box plot for the test scores of two classes, A and B: **1 / 1 point**




Which of the following statements is true?

- ☐ The median score of Class A is higher than the median score of Class B.
- ☑ The median score of Class B is higher than the median score of Class A.

**Correct**
Correct! Looking at the box plot, we can see that the median of Class A is around 75, while the median of Class B is around 85.

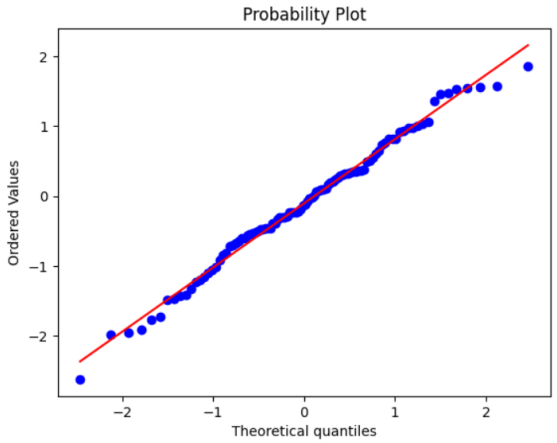
- ☑ The interquartile range of Class A is larger than the interquartile range of Class B.

**Correct**

Correct! The rectangle in A is bigger than B.

- [ ] The interquartile range of Class B is larger than the interquartile range of Class A.

**9.** Consider the following QQ plot for a set of data: **1 / 1 point**




Which of the following statements is true?

- (•) The data looks normally distributed.
- ( ) The data is not normally distributed.
- ( ) The data has a higher variance than a normal distribution.
- ( ) The data has a lower variance than a normal distribution.

**Correct**
The QQ plot compares the observed data with the theoretical quantiles of a normal distribution. If the points lie close to the diagonal line, then the data is likely normally distributed.