## Congratulations! You passed!

**Grade received** 80% **To pass** 80% or higher

Go to next item

1. 0 / 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

**Incorrect**

Have a look again at the samples. Which one has the least spread among them? You can also use the formula $Var(X) = E[X^2] - E[X]^2$ to get the result.

**2.** Consider two games, Game A and Game B, each with different probability distributions of winnings and losses. Game A has a probability of $\frac{1}{3}$ to win \$2 and a probability of $\frac{2}{3}$ to lose \$1. Game B has a probability of $\frac{1}{2}$ to win \$0.50, a probability of $\frac{1}{4}$ to lose \$0.50, a probability of $\frac{1}{8}$ to win \$5, and a probability of $\frac{1}{8}$ to lose \$2.

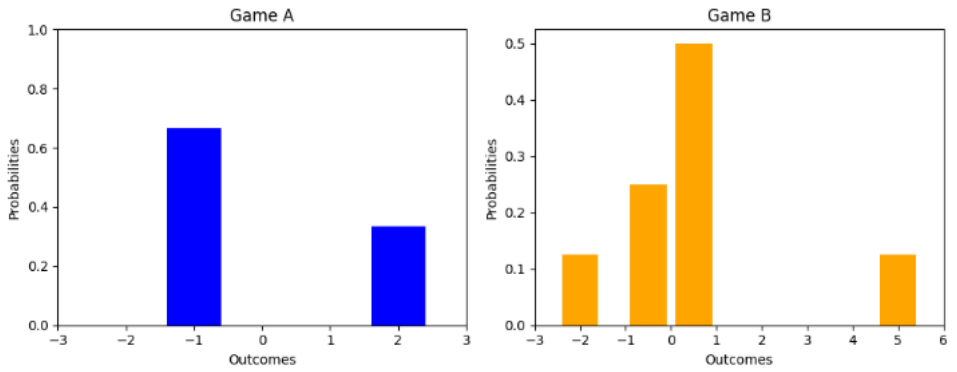
**1 / 1 point**

Which of the following statements is **true**?

- ○ Both Game A and Game B have the same kurtosis.
- ○ Game B's kurtosis is smaller than Game A's kurtosis.
- ◉ Game A's kurtosis is smaller than Game B's kurtosis.

**Correct**

Kurtosis measures the shape and thickness of the rails of a probability distribution. A larger kurtosis indicates thicker tails and more extreme values. In this case, Game Y has a larger kurtosis because it has thicker tails due to the presence of extreme values (winning \$5 or losing \$2 with small probabilities).




**3.** Consider the following **independent** random variables:

**1 / 1 point**

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

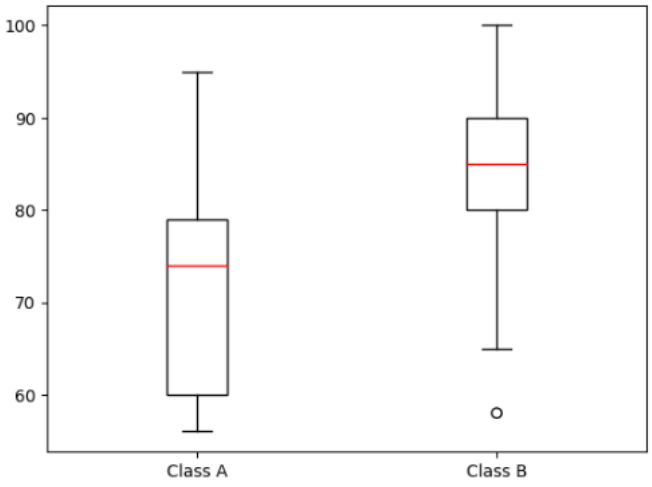
Then $Z = X + Y \sim \text{Normal}(\mu, \sigma)$, where $\mu, \sigma$ are equal to:

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

**Correct**

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

4. 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?

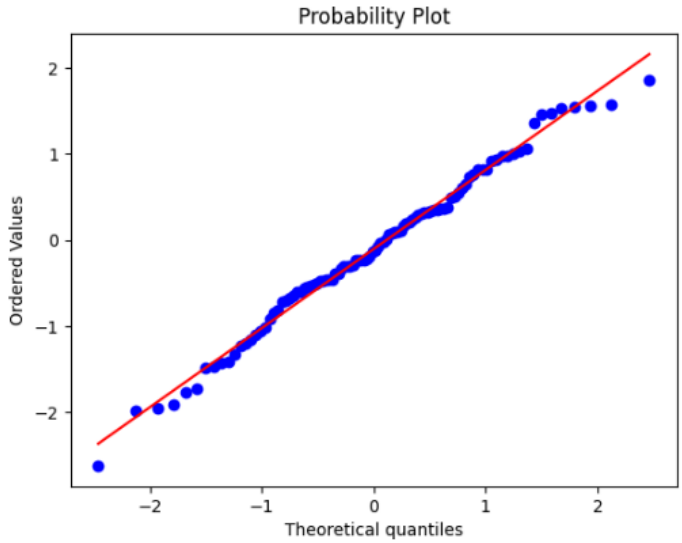
- [ ] Class B's interquartile range (IQR) is larger than Class A's interquartile range.
- [ ] Class A's median score is higher than Class B's median score.
- [x] Class A's interquartile range (IQR) is larger than Class B's interquartile range.

Correct
The rectangle in A is bigger than B.

- [x] Class B's median score is higher than Class A's median score.

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.

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




Which of the following statements is true?

- ○ The data is not normally distributed.
- ◉ The data looks normally distributed.
- ○ The data has a lower variance than a normal distribution.
- ○ The data has a higher 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.