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1. What is the difference between sample mean and population mean?   **1 / 1 point**

⊙ Sample mean is the average of a subset of the population, while population mean is the average of the entire population.

○ Sample mean is always smaller than population mean.

○ There is no difference between sample mean and population mean.

✓ **Correct**
Correct! Sample mean is the average of a subset of the population, while population mean is the average of the entire population.

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2. Which of the following method can be used to estimate the variance, mean, and proportion of a population?   **1 / 1 point**

○ Sample mean

○ Sample variance

⊙ Point estimation

○ Regression analysis

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✓ **Correct**
Correct! Point estimation is a statistical method that estimates population parameters such as mean, variance, and proportion based on a sample.

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3. Which of the following statements best describes the law of large numbers?   **1 / 1 point**

○ The law of large numbers states that as the sample size increases, the sample mean becomes more variable.

⊙ The law of large numbers states that as the sample size increases, the sample mean approaches the population mean with increasing accuracy.

○ The law of large numbers states that as the sample size increases, the sample variance approaches the population variance.

○ The law of large numbers states that as the sample size increases, the sample becomes more biased.

✓ **Correct**
Correct! The law of large numbers states that as the sample size increases, the sample mean approaches the population mean with increasing accuracy.

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4. Suppose you flip a coin 10 times and obtain 6 heads and 4 tails. What function needs to be maximized to find the maximum likelihood estimate of the probability of getting heads on a single coin toss? Let p be the probability of the coin being heads.   **1 /**

○ $L(p) = p^{1/6}(1-p)^{1/4}$

⊙ $L(p) = p^6(1-p)^4$

○ $L(p) = p^4(1-p)^6$

○ $L(p) = p^{10}(1-p)^0$

✓ **Correct**
Correct! The likelihood function for this problem is L(p) = p^6*(1-p)^4.

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5. What is the purpose of regularization in machine learning?   **1 / 1 point**

○ Regularization is used to make a model more complex and flexible, which can lead to better performance on the training data.

⊙ Regularization is used to prevent overfitting and reduce the complexity of a model, by adding a penalty term to the loss function that encourages smaller parameter values.

○ Regularization is used to increase the training error of a model, which can improve its generalization performance.

○ Regularization is used to improve the interpretability of a model by reducing its complexity.

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6. Consider the following population: $[-2, -1, 0, 1, 2]$ and the following sample $[-1, 0, 2]$.

1 / 1 point

What is the **population mean?**

0

✓ **Correct**
Correct!

7. Consider the following population: $[-2, -1, 0, 1, 2]$ and the following sample $[-1, 0, 2]$.

0 / 1 point

What is the **sample variance? (Use two decimal places in your answer)**

3.83

✗ **Incorrect**
Incorrect! Please review your calculations! Remember that the **sample** variance is divided $n - 1$ instead of n, where n is the sample size.