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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.

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

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

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.

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 / 1 point**

- ( ) $L(p) = p^{1/6}(1-p)^{1/4}$
- (●) $L(p) = p^{6}(1-p)^{4}$
- ( ) $L(p) = p^{4}(1-p)^{6}$
- ( ) $L(p) = p^{10}(1-p)^{0}$

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

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.

Correct

Correct! 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.

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 $[-1, 0, 2]$. **1 / 1 point**

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

2.33

Correct

Correct!