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The Central Limit Theorem - Quiz

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Question 1

1/1 point (graded)

True or False: The Central Limit Theorem (CLT) implies that for a reasonably large random sample, the distribution of your population will be approximately normal.

- a. True
- b. False ✔

Explanation

The CLT implies that the distribution of the sample mean for an i.i.d. random sample will be approximately normal if the sample size is large enough. The distribution of the population will be determined by the specific characteristics of that population and generally, will not be affected by changes in the sample size.

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✔ Correct (1/1 point)

Question 2

1/1 point (graded)

_____ is the process of subtracting the mean of a distribution and dividing by the square root of its variance.

- a. Estimation
- b. Realization
- c. Randomization
- d. Standardization ✔

Explanation

D. As mentioned by Professor Ellison, standardization is the process of subtracting the mean of a distribution and dividing by the square root of its variance, which creates a random variable with 0 mean and variance 1. The other options are unrelated statistical concepts.

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✔ Correct (1/1 point)

Question 3

1/1 point (graded)

The central limit theorem says that:

$$\lim_{n\to\infty} P\left[\frac{\sqrt{n}(\bar{x}-\mu)}{\sigma} \leq x\right] = \Phi(x)$$

$P\left[\frac{\sqrt{n}(\bar{x}-\mu)}{\sigma} \leq x\right]$ represents:

- a. The probability distribution function (PDF) of the standardized sample mean
- b. The cumulative distribution function (CDF) of the standardized sample mean ✔
- c. The probability distribution function (PDF) of the population
- d. The cumulative distribution function (CDF) of the population

Explanation

We know that it is a CDF because the definition of a CDF is the probability that a random variable is less than or equal to some value of x. We know that it is the CDF of the standardized sample mean because $\frac{\sqrt{n}(\bar{x}-\mu)}{\sigma}$ is the sample mean $\bar{x}$ after the process of subtracting the mean of the distribution of $\bar{x}$ (which

is μ) and dividing by the square root of the variance (the square root of the variance is $\frac{\sigma}{\sqrt{n}}$)

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