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More on the Sample Mean - Quiz

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Question 1

1/1 point (graded)

For an i.i.d. random sample, how does increasing the sample size affect the expectation of the sample mean?

☐ a. Decreases the expectation of the sample mean

☐ b. Increases the expectation of the sample mean

☒ c. No effect on the expectation of the sample mean ✓


Explanation

The expected value of a sample mean is $\mu(E(X_i))$. $E(X_i)$ will be determined by the shape of the distribution of the X 's, which will not change as the sample size increases.


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Finger Exercises due Nov 07, 2016 at 05:00 IST 

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Question 2

1/1 point (graded)

For a population of size n from an i.i.d distribution with variance σ^2 , which of the following expressions is the variance of the sample mean?

☐ a. $\frac{\sigma^2}{n^2}$

☐ b. $\frac{\sigma}{n}$

☐ c. σ^2

☒ d. $\frac{\sigma^2}{n}$ ✓

Explanation

D is the correct answer. Professor Ellison derives this result in the lecture slides. Here is a quick summary of that derivation:

By the definition of the sample mean, $Var(\bar{X}) = Var(\frac{1}{n}(\sum X_i))$

By properties of variance, $Var(\frac{1}{n}(\sum X_i)) = \frac{1}{n^2} \sum Var(X_i)$

Finally, it simplifies to $\frac{1}{n^2} \sum \sigma^2 = \frac{\sigma^2}{n}$

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Discussion

Topic: Module 6 / More on the Sample Mean - Quiz

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