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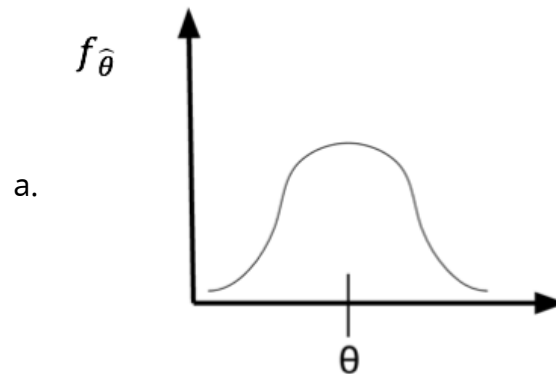
Unbiased Estimators - Quiz

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Question 1

1.0/1.0 point (graded)

Which estimators $\hat{\theta}$ are unbiased? These graphs show PDFs of $\hat{\theta}$. (Select all that apply.)




▶ Module 5: Moments of a Random Variable, Applications to Auctions, & Intro to Regression


▶ Module 6: Special Distributions, the Sample Mean, the Central Limit Theorem, and Estimation

▼ Module 7: Assessing and Deriving Estimators - Confidence Intervals, and Hypothesis Testing


Assessing and Deriving Estimators

Finger Exercises due Nov 14, 2016 at 05:00 IST 

Confidence Intervals and Hypothesis Testing

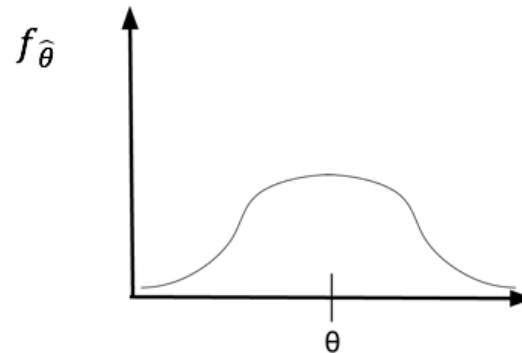
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Module 7: Homework

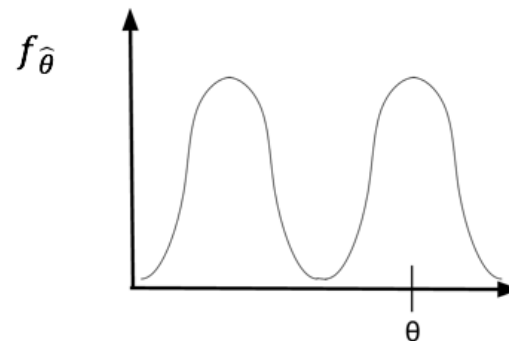
Homework due Nov 07, 2016 at 05:00 IST 



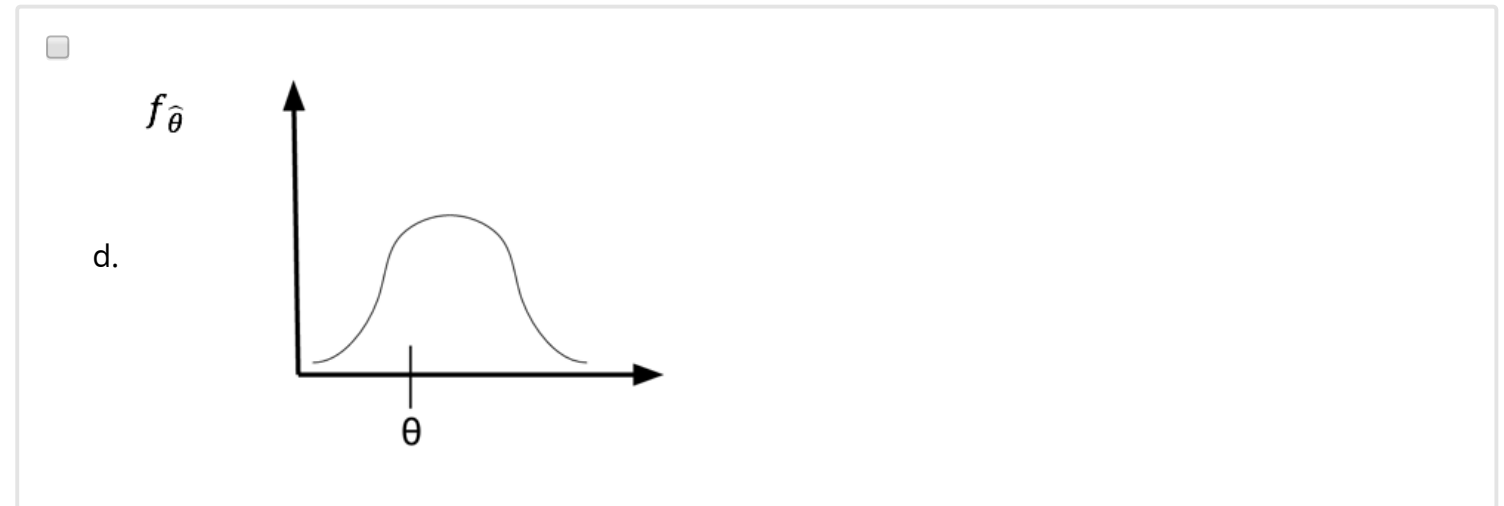
b.



c.



► Exit Survey



Explanation

Recall the definition of an unbiased estimator: an estimator $\hat{\theta}$ is unbiased if, in expectation, it is equal to the parameter it is trying to estimate. (In other words, an estimator is unbiased for θ if $E[\hat{\theta}] = \theta$ for all θ in Φ .) Therefore, the estimators in a. and b. are both unbiased, because the expectation of $\hat{\theta}$ is the center of the distribution.

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You have used 1 of 2 attempts

Question 2

1.0/1.0 point (graded)

Suppose we are trying to estimate the mean μ of a $N(\mu, \theta)$ distribution. Which of the following estimators would be unbiased? (Select all that apply)

- ☒ a. $\hat{\mu} = \frac{1}{n} \sum_{i=1}^n X_i$
- ☐ b. $\hat{\mu} = \frac{1}{2} \max\{X_1, X_2, \dots, X_n\}$
- ☐ c. $\hat{\mu} = n \min\{X_1, X_2, \dots, X_n\}$
- ☐ d. $\hat{\mu} = \frac{2}{n} \sum_{i=1}^n X_i$



Explanation

We can calculate the expectation of any of these estimators to determine whether they are biased. The estimator in (a) is unbiased: $E\left[\frac{1}{n} \sum_{i=1}^n X_i\right] = \frac{1}{n} \sum_{i=1}^n E[X_i] = \frac{1}{n} \sum_{i=1}^n \mu = \frac{n\mu}{n} = \mu$. The estimator in (b) is biased because, as we saw in lecture, the n^{th} order statistic is a biased estimator for μ . Intuitively, the estimator will always be less than or equal to θ , and equal θ with 0 probability. The estimator in (c) can be shown to be a biased estimator for μ , in the same way the n^{th} order statistic is a biased estimator. The estimator in (d) would estimate θ , not μ .

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You have used 1 of 2 attempts

Discussion

Topic: Module 7 / Unbiased Estimators - Quiz

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