

Question 1

4 pts

Assume simple random sampling (SRS) from a population with the population variance σ^2 .

Then $\hat{\sigma}^2 = \frac{1}{n} \sum_{i=1}^n (X_i - \bar{X})^2$, where X_1, X_2, \dots, X_n denotes the sample, is an unbiased estimator of σ^2 .

☐ True

☐ False

Question 2

4 pts

Assume simple random sampling (SRS) from a population that is characterized by a parameter θ . Let $\hat{\theta}$ be a function of the sample X_1, X_2, \dots, X_n .

If $E[\hat{\theta}] = \frac{3}{4}\theta$, then $\frac{4}{3}\hat{\theta}$ is

(A) biased

(B) unbiased

estimator of θ .

Please select:

☐ A

☐ B

**Question 3****4 pts**

Assume simple random sampling (SRS) from a population of size 8. If the sample size is 3 and we observe 10, 20, and 30, what is an unbiased estimate of the population mean?

**Question 4****4 pts**

Assume simple random sampling (SRS) from a population of size 8. If the sample size is 3 and we observe 10, 20, and 30, what is an unbiased estimate of the population variance?

**Question 5****4 pts**

Assume simple random sampling (SRS) from a population of size 8. If the sample size is 3 and we observe 10, 20, and 30, what is an unbiased estimate of the variance of the sample mean, $\text{Var}(\bar{X})$?