

Exercise for Week 11

⚠ This is a preview of the published version of the quiz

Started: 27 Oct at 23:54

Quiz instructions

Quiz time is from 09:15am to 10:30am of October 25

Question 1

1 pts

Which of the following is **CORRECT**?

- ☐ If X_1, X_2, \dots, X_n follow the $N(0, \sigma^2)$ distribution, then $\frac{X_1^2 + X_2^2 + \dots + X_n^2}{\sigma^2}$ follows the $\chi^2(n)$ distribution.
- ☒ If $T \sim t(n)$, then $T^2 \sim F(1, n)$.
- ☐ If $U \sim N(0, 1)$, $V \sim \chi^2(m)$, then $\sqrt{m}U/\sqrt{V} \sim t(m)$.
- ☐ None of the given options

Question 2

1 pts

Suppose that X_1, X_2, \dots, X_{100} are independent and identically distributed random variables following the $N(0, \sigma^2)$ distribution with $\sigma^2 > 0$. Which of the following is **WRONG**?

- ☐ The sample variance $S^2 = \frac{\sum_{i=1}^{100} (X_i - \bar{X})^2}{99}$ is an unbiased estimator of σ^2 .
- ☐ Let $\tilde{S}^2 = \frac{\sum_{i=1}^{100} X_i^2}{100}$. Then \tilde{S}^2 is an unbiased estimator of σ^2 .

☒ $X_1 + X_2 + \dots + X_{10}$ has a bigger variance than $X_1 + X_2 + \dots + X_{100}$.

☐ $\frac{X_1 + X_2 + \dots + X_{10}}{10}$ has a bigger variance than \bar{X} .

Question 3

1 pts

The observed values of a random sample of size 5 from a $N(\mu, 1^2)$ population are {6.0, 7.0, 5.5, 7.1, 5.9}. Which of the following is/are unbiased estimates for μ ?

☐ $\bar{x} = 6.5$

☐ $(x_1 + x_2)/2 = 6.5$

☐ $x_5 = 5.9$

☒ All are unbiased estimates

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