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reviewer4@nptel.iitm.ac.in ▼

Courses » Probability and Statistics

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Unit 14 - Week 12

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Assignment 12

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-04-24, 23:59 IST

1 point

1) Let X_1, \dots, X_n be a random sample from a $N(\mu, \sigma^2)$ population where $\sigma^2 = \sigma_0^2$ is known. A test for $H_1 : \mu = \mu_0$ vs. $K_1 : \mu = \mu_1$, where $\mu_0 > \mu_1$ is

a. Reject H_1 if $\left| \sqrt{n} \left(\frac{\bar{X} - \mu_0}{\sigma_0} \right) \right| \geq Z_{\alpha/2}$

b. Reject H_1 if $\sqrt{n} \left(\frac{\bar{X} - \mu_0}{\sigma_0} \right) \leq -Z_\alpha$

c. Reject H_1 if $\sqrt{n} \left(\frac{\bar{X} - \mu_0}{\sigma_0} \right) \geq Z_\alpha$

d. Reject H_1 if $\left| \left(\frac{\bar{X} - \mu_0}{\sigma_0 \sqrt{n}} \right) \right| \geq Z_{\alpha/2}$

- a.
- b.
- c.
- d.

No, the answer is incorrect. Score: 0

Accepted Answers:

b.

1 point

2) Let X_1, \dots, X_n be a random sample from a $N(2, \sigma^2)$ population. Consider the hypothesis $H_1 : \sigma^2 \leq 2$ vs. $K_1 : \sigma^2 > 2$. If $n = 10$ and $\sum_{i=1}^{10} (X_i - 2)^2 = 30$, what will be the decision for this testing problem when $\alpha = 0.05$?

- a. Reject H_1
- b. Accept H_1
- c. Critical point is 19.60
- d. The value of the test statistic is 10.45

- a.
- b.

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b.

3)

1 point

In Question 2, if $n = 8$ and $\sum_{i=1}^8 (X_i - 2)^2 = 34$, what will be the decision for this testing problem when $\alpha = 0.05$?

- a. Reject H_1
- b. Accept H_1
- c. Critical point is 14.60
- d. The test value is 11.05

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

4)

1 point

Let X_1, \dots, X_{10} be a random sample from an exponential distribution with parameter λ . Consider the hypothesis $H_1: \lambda = 5$ vs. $K_1: \lambda = 4$. The MP test at 5% level of significance is to Reject the null hypothesis if

- a. $8 \sum_{i=1}^{10} X_i \leq \chi_{20, 1-\alpha}^2$
- b. $10 \sum_{i=1}^{10} X_i \geq \chi_{20, \alpha}^2$
- c. $5 \sum_{i=1}^{10} X_i \leq \chi_{10, 1-\alpha}^2$
- d. $5 \sum_{i=1}^{10} X_i \geq \chi_{10, \alpha}^2$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

5)

1 point

Let X_1, \dots, X_{10} be a random sample from a normal population with variance σ^2 . Let $H_1: \sigma^2 = 4$ vs. $K_1: \sigma^2 \neq 4$. Then an asymptotic critical region of size α for this test is

- a. $\left| \sqrt{10} \frac{(S-4)}{4} \right| \leq Z_{\alpha/2}$
 b. $\left| \sqrt{10} \frac{(S-4)}{4} \right| \geq Z_{\alpha/2}$
 c. $\left| \sqrt{20} \frac{(S-4)}{4} \right| \geq Z_{\alpha/2}$
 d. $\left| \sqrt{20} \frac{(S-4)}{4} \right| \leq Z_{\alpha/2}$

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

6)

1 point

Let X_1, \dots, X_{10} and Y_1, \dots, Y_{10} be two independent samples from $N(\mu_1, 1)$ and $N(\mu_2, 2)$ population respectively. For a hypothesis $H_1: \mu_1 = \mu_2$ vs. $K_1: \mu_1 \neq \mu_2$, a size α critical region is

- a. $\left| \sqrt{\frac{10}{3}} (\bar{X} - \bar{Y}) \right| \geq z_{\alpha/2}$
 b. $\left| \sqrt{\frac{10}{3}} (\bar{X} - \bar{Y}) \right| \geq z_{\alpha}$
 c. $\left| \sqrt{\frac{3}{10}} (\bar{X} - \bar{Y}) \right| \geq z_{\alpha/2}$
 d. $\left| \sqrt{\frac{3}{10}} (\bar{X} - \bar{Y}) \right| \geq z_{\alpha}$

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

7)

1 point

Two new drug A and B were tested on two sets X and Y of patients. A random sample of 10 patients from the set (to which drug A tested) and a random sample of 15 patient from the set (to which drug B is tested) were chosen and the effects were observed after certain period of time. The following observations are obtained: $\bar{x} = 28$, $S_1 = 5.88$ and $\bar{y} = 30$ and $S_2 = 10.04$ for drug A and B respectively. Assume that the populations of measurements on effects of drug A and drug B have normal distributions and have the same variance. For testing the equality of mean effects, the value of the test statistic at 5% level of significance is

- a. 0.220
- b. 0.192
- c. -0.610
- d. -0.192

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

8)

1 point

A random sample of size n from a $N(\mu_1, 625)$ population has mean 50. An independent random sample of size n from a $N(\mu_2, 625)$ has mean 45. In order to test $H_0: \mu_1 = \mu_2$ vs. $H_1: \mu_1 \neq \mu_2$ the maximum value of n so that H_0 is accepted at 5% level of significance is

- a. 48
- b. 64
- c. 96
- d. 192

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

d.

9)

1 point

Let X_1, \dots, X_{16} be a random sample from $N(\mu, 16)$. To test $H_0: \mu = 20$ vs. $K_1: \mu \neq 20$, consider the following critical region: $C = \{\bar{x}: |\bar{x} - 20| \geq a\}$. Find the value of a so that the size of the critical region is 0.05.

- a. 0.94
- b. 1.96
- c. 2.33
- d. 2.54

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

10)

1 point

In Question 9, find the power of the test for the given critical region when $\mu = 30$ and $\alpha = 1.96$.

- a. 0.5
- b. 0.7
- c. 0.9
- d. 1

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

d.

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