

Unit 9 - Week 8

Course outline

How does an NPTEL online course work?

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Statistical Inference-19

Statistical Inference-20

Statistical Inference-21

Quiz : Assignment 8

Week 8 Feedback Form

Download Videos

Assignment Solution

Assignment 8

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

Due on 2020-03-25, 23:59 IST.

1) Suppose X is a single observation from a population with pdf given by $f(x) = \theta x^{\theta-1}$ for $0 < x < 1$. Find the value of k where the test with the best critical region with significance level 0.08, for testing the simple hypothesis $H_0: \mu_0 = 3$ against alternative hypothesis $H_1: \mu_1 = 2$ is $x < k$. ($100^{1/3} = 4.64$) 1 point

- 0.215
 0.431
 0.342
 0.5

No, the answer is incorrect. Score: 0

Accepted Answers: 0.431

2) Suppose X_1, X_2, \dots, X_n is a random sample from a normal population with mean μ and variance 16 with a sample size of $n = 16$ and a significance level $\alpha = 0.05$ to test the simple null hypothesis $H_0: \mu = 10$ against the simple alternative hypothesis $H_A: \mu = 15$. ($Z_{0.05} = 1.645$). Find the test with the best critical region, that is, find the most powerful test 1 point

- $\bar{X} < 1.645$
 $\bar{X} < 11.645$
 $\bar{X} > 1.645$
 $\bar{X} > 11.645$

No, the answer is incorrect. Score: 0

Accepted Answers: $\bar{X} > 11.645$

3) Suppose X_1, X_2, \dots, X_n is a random sample from a normal population with mean μ and variance 16 with a sample size of $n = 16$ and a significance level $\alpha = 0.05$ to test the simple null hypothesis $H_0: \mu = 10$ against the simple alternative hypothesis $H_A: \mu = 15$. ($Z_{0.05} = 1.645$). Find the power of the most powerful test. Let ϕ be the CDF of the standard normal distribution. 1 point

- $\phi(-3.36)$
 $\phi(2.98)$
 $\phi(3.36)$
 $\phi(-2.98)$

No, the answer is incorrect. Score: 0

Accepted Answers: $\phi(3.36)$

4) A coin is tossed 5 times. The null hypothesis supposes that the coin is fair as opposed to the alternate hypothesis which has a probability of 0.4 of getting heads. We accept the null hypothesis only if we get 2 or 3 heads. What are the probabilities of type 1 and type 2 error? 0 points

- 0.625 and 0.424
 0.625 and 0.576
 0.375 and 0.424
 0.375 and 0.576

No, the answer is incorrect. Score: 0

Accepted Answers: 0.625 and 0.576

5) Suppose X_1, X_2, \dots, X_n is a random sample from a normal population with mean θ and variance σ^2 with a sample size of $n = 5$ and a significance level $\alpha = 0.05$ to test the simple null hypothesis $H_0: \sigma_0^2 = 1$ against the simple alternative hypothesis $H_A: \sigma_1^2 = 4$. Then, which of the following is the most powerful critical region? 1 point

- $\sum_{i=1}^5 x_i^2 > k$
 $\sum_{i=1}^5 x_i^2 < k$
 $\sum_{i=1}^5 x_i > k$
 $\sum_{i=1}^5 x_i < k$

No, the answer is incorrect. Score: 0

Accepted Answers: $\sum_{i=1}^5 x_i^2 > k$

6) Suppose we want to test the hypothesis that among diabetic men, the mean systolic blood pressure greater than 140 using $\alpha = 0.01$. We carry out two tests. In the first test blood pressure of 157 patients was examined and the result was 146 mm Hg with a standard deviation of 27 mm. In the second test 40 people were examined and we got the same result i.e. Mean blood pressure 146 mm with a standard deviation of 27 mm. What will be the conclusion of the two tests? (Use value of Z when $\alpha = 0.01$ as 2.33) 1 point

- Accept when we test on 157 people, reject otherwise
 Reject when we test on 157 people, accept otherwise
 Accept in both cases
 Reject in both cases

No, the answer is incorrect. Score: 0

Accepted Answers: Reject when we test on 157 people, accept otherwise

7) If we reject a hypothesis at 0.1 level of significance, then which of the following is true? 1 point

- We must reject the hypothesis at 0.2 level of significance
 We must accept the hypothesis at 0.2 level of significance
 We must reject the hypothesis at 0.05 level of significance
 We must accept the hypothesis at 0.05 level of significance

No, the answer is incorrect. Score: 0

Accepted Answers: We must reject the hypothesis at 0.2 level of significance

8) Fast Food A outlet claims that they will serve faster than fast food outlet B.. To test this claim, time in minutes from entering the outlet for receiving the order was secretly recorded for 10 recordings in both the outlets. Then which of the following tests do we use to test the hypothesis? 0 points

- Paired T-test with 20 degree of freedom
 Z-test
 Two sample t-test with 19 degrees of freedom
 χ^2 test with 20 degrees of freedom

No, the answer is incorrect. Score: 0

Accepted Answers: Two sample t-test with 19 degrees of freedom

9) If a sample of 100 is chosen from each school and each student is evaluated as pass or fail for a fitness test. Authorities claim that all the students are capable of passing the test. Perform goodness of fit test on following data - 1 point

City	O _i	E _i
A	98	100
B	79	100

What is the value of statistic and does the hypothesis hold?(take critical values for $\alpha = 0.025$ for Z-distribution is 1.96)

- 4.45 and hypothesis holds
 4.45 and hypothesis does not hold
 3.81 and hypothesis holds
 3.81 and hypothesis does not hold

No, the answer is incorrect. Score: 0

Accepted Answers: 4.45 and hypothesis does not hold

10) From the past record, we know that the average marks in an exam is 70 with a standard deviation of 7. Examiner claims with 95 percent confidence that the same trend will be followed for this sample of 400 students as well. Let their average score be μ . What should be the range of μ for the claim to hold true? (take critical values for $\alpha = 0.1$ to be -1.64 and 1.64) 1 point

- [68.36, 70.64]
 [63,77]
 [69.426, 70.574]
 [66.5,73.5]

No, the answer is incorrect. Score: 0

Accepted Answers: [69.426, 70.574]