

Unit 10 - Week 8

Course outline

How does an NPTEL online course work?

Practice Assignment

Week 1

Week 2

Week 3

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Week 7

Week 8

Lecture 68: Hypothesis Testing I

Lecture 69: Hypothesis Testing II

Lecture 70: Hypothesis Testing III

Lecture 71: Hypothesis Testing IV

Lecture 72: Hypothesis Testing V

Lecture 73: Hypothesis Testing VI

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Quiz : Assignment 8

Assignment 8

Assignment 8 solution

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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) The design engineer has to design an air crew escape system for fighter aeroplane for safely exit of pilot during the situation of crash. The system consists of an ejection of seat and a rocket motor that powers the seat. The rocket motor contains a propellant and to function ejection of seat properly the mean burning rate of propellant required is 50 mm/sec. The design engineer want to test a hypothesis $H_0 : \theta \leq 50$. What kind of hypothesis it is :

- Simple null hypothesis
 Composite null hypothesis
 Simple alternate hypothesis
 Composite alternate hypothesis

No, the answer is incorrect. Score: 0

Accepted Answers:
Composite null hypothesis

2) Consider the air crew escape system discussed in question 1. The design engineer tested 10 systems and estimated a critical region for true population mean (\bar{x}) where null hypothesis is rejected are $\bar{x} \leq 48.5$ and $\bar{x} \geq 51.5$. The system can't be rejected for the mean burning rate

- 50.3 mm/sec
 52.5 mm/sec
 46.5 mm/sec
 49 mm/sec

No, the answer is incorrect. Score: 0

Accepted Answers:
50.3 mm/sec
49 mm/sec

3) A product design engineer want to test a hypothesis that newly designed product is more efficient than the older product. The type I error for this case is given by:

- Accept the null hypothesis when new product is more efficient
 Reject the null hypothesis when new product is more efficient
 Accept the null hypothesis when new product is not more efficient
 Reject the null hypothesis when new product is not more efficient

No, the answer is incorrect. Score: 0

Accepted Answers:
Reject the null hypothesis when new product is more efficient

4) A random sample of size 20 is drawn from normal population. In order to test the null hypothesis that mean = 33 against the alternative that mean $\neq 33$, under the null hypothesis the test statistic would follow

- Standard normal distribution
 t distribution with 19 degrees of freedom
 F distribution with 1 and 19 degrees of freedom
 Chi-square distribution with 19 degrees of freedom
 t distribution with 20 degrees of freedom
 t distribution with 18 degrees of freedom

No, the answer is incorrect. Score: 0

Accepted Answers:
t distribution with 19 degrees of freedom

5) Suppose the life of a battery known to follow the normal distribution. The manufacturer claims that the mean life of a battery is 100 hr with a standard deviation of 3 hr. As a customer you wish to test the hypothesis $H_0 : \mu = 100$ vs $H_1 : \mu \neq 100$. The 9 specimens are tested and the product will be accepted by the customer if the mean life of the battery lies in between $98.5 \leq \bar{x} \leq 101.5$. Find the probability of type I error?

- 0.1336
 0.0668
 0.9332
 0.9525

No, the answer is incorrect. Score: 0

Accepted Answers:
0.1336

6) A machine tool manufacturer ordered some high strength steel from a supplier intended to use as a shaft. The supplier reported that steel has a mean strength of 23800 kN/m² with standard deviation of 415 kN/m². If the 12 samples of supplied lot tested for strength and found that the strength was 24150 kN/m². If the significance level is 0.05 then lot should be _____.

Hint

No, the answer is incorrect. Score: 0

Accepted Answers:
String starting with: rejected
(Type: String) reject

1 point

7) A home appliance manufacturer has published data on the power used by various home appliances in kWh per year. It is claimed that vacuum cleaner uses an average of 46 kWh power per year. If a random sample of 12 is collected and studied, it is observed that an average of 42 kWh with a standard deviation of 11.9 kWh power is consumed by the vacuum cleaner. We wish to know if, on the basis of these data, that the mean annual power consumption of vacuum cleaner is less than 46 kWh with $\alpha = 0.01$.

Identify the correct null and alternate hypotheses for this problem.

- $H_0 : \mu = 46, H_1 : \mu \neq 46$
 $H_0 : \mu = 46, H_1 : \mu < 46$
 $H_0 : \sigma = 46, H_1 : \sigma < 46$
 $H_0 : \sigma = 46, H_1 : \sigma \neq 46$

No, the answer is incorrect. Score: 0

Accepted Answers:
 $H_0 : \mu = 46, H_1 : \mu < 46$

8) Consider 50 independent Bernoulli trials with probability of success p. To test the hypothesis that p = 0.6, against the alternative that p < 0.6, under the null hypothesis the test statistic will follow

- Standard normal distribution
 t distribution with 49 degrees of freedom
 F distribution with 1 and 49 degrees of freedom
 Chi-square distribution with 49 degrees of freedom
 t distribution with 50 degrees of freedom
 t distribution with 48 degrees of freedom

No, the answer is incorrect. Score: 0

Accepted Answers:
Standard normal distribution

9) Consider a sample of size 100 from $N(\mu, \sigma^2)$. To test the hypothesis that $\sigma = \sigma_0$ against the alternative $\sigma \neq \sigma_0$, the test statistic is given by $\frac{s^2}{\sigma_0^2}$ and when the null hypothesis is true it follows _____ distribution with _____ degrees of freedom.

(Type answer like this "distribution name , degree of freedom"

Example : F,200)

Note : Don't use "space" before and after comma as shown in example .

Hint

No, the answer is incorrect. Score: 0

Accepted Answers:
(Type: String) chi-square,99
(Type: String) chi square,99
(Type: String) chisquare,99
(Type: String) chi-square , 99
(Type: String) chi-square, 99

1 point