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Courses » Probability and Statistics

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## Unit 10 - Week 8

Register for Certification exam

### Course outline

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Lecture 47: Chi-Square Distribution (Cont...), t-Distribution

Lecture 48 : F-Distribution

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Quiz : Assignment 8

Feedback for Week 8

### Assignment 8

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

Due on 2019-03-27, 23:59 IST

1) 1 point  
 Let  $(X_1, X_2, \dots, X_{10})$  and  $(Y_1, Y_2, \dots, Y_{10})$  be independent random samples from  $N(\mu_1, \sigma_1^2)$  and  $N(\mu_2, \sigma_2^2)$  populations respectively. Find the distribution of

$$\frac{\sqrt{20} (\bar{X} - \bar{Y} - (\mu_1 - \mu_2))}{\sqrt{\left[ \frac{S_1^2}{\sigma_1^2} \right] + \left[ \frac{S_2^2}{\sigma_2^2} \right]}}$$

- a.  $t_{18}$
- b.  $t_{19}$
- c.  $t_{20}$
- d.  $t_{21}$

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

2) 1 point  
 A random sample of size 4 is taken from normal population with mean 2 and variance  $\sigma^2$ . Find the probability that sample variance lies between 82.86 and 93.78 (approximately).

- a. 0.050
- b. 0.025
- c. 0.925
- d. 0.995

- a
- b

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Assignment Solution

3) 1 point  
 Let  $S_1^2$  and  $S_2^2$  be the sample variances from two independent samples of sizes  $n_1 = 5$  and  $n_2 = 5$  from two normal populations having the same unknown variance  $\sigma^2$ . Find (approximately) probability that  $\frac{S_1^2}{S_2^2} > 9.28$ .

- a. 0.90  
 b. 0.50  
 c. 0.05  
 d. 0.01

- a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

4) 1 point  
 Let  $(X_1, X_2, \dots, X_5)$ ,  $(Y_1, Y_2, \dots, Y_5)$  and  $(Z_1, Z_2, \dots, Z_{10})$  be independent random samples from  $N(1, 9)$ ,  $N(1, 9)$  and  $N(0, 9)$  populations respectively. Then the distribution of

$$W = \frac{\sum_{i=1}^5 (X_i - Y_i)^2}{\sum_{j=1}^{10} Z_j^2} \text{ is}$$

- a.  $\chi_{10}^2$   
 b.  $F_{10,5}$   
 c.  $F_{5,10}$   
 d.  $t_{10}$

- a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

5) 1 point  
 Let  $S_1^2$  and  $S_2^2$  be variances of independent random samples of size  $n_1 = 5$  and  $n_2 = 5$ , taken from normal populations with common variance  $\sigma^2 = 10$ . Find  $P(S_1^2 + S_2^2 < 30.07)$  (approximately).

- a. 0.30  
 b. 0.15  
 c. 0.70  
 d. 0.85

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

d

6)

1 point

Let  $\sum_{i=1}^8 x_i = 120$ ,  $\sum_{i=1}^8 x_i^2 = 1880$ . Let  $x_9 = k$  and  $x_{10} = -k$  and  $\sum_{i=1}^{10} (x_i - \bar{x})^2 = 490$ . Then the absolute value of  $k$  is

- a. 3
- b. 4
- c. 5
- d. 6

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

7)

1 point

Which among the following statement is true?

- a. Student's t-distribution is asymptotic  $N(0,1)$  as degrees of freedom tend to infinity
- b. Student's t-distribution is asymptotic  $N(\mu, \sigma^2)$  as degrees of freedom tend to infinity
- c. Student's t-distribution is asymptotic  $\chi^2$  as degrees of freedom tend to infinity
- d. Chi-square distribution is asymptotic F-distribution as degrees of freedom tend to infinity

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

8)

1 point

Let  $X_1, X_2, \dots, X_{2n}$  be independent  $N(\mu, 1)$  random variables and  $W = \frac{1}{2} \sum_{i=1}^n (X_{2i-1} - X_{2i})^2$ . Then  $W$  has distribution

- a.  $\chi_n^2$
- b.  $\chi_{2n}^2$
- c.  $t_{2n}$
- d.  $F_{n,n}$

- a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

9)

1 point

Let  $X_1, X_2, \dots, X_{10}$  be a random sample from a  $N(0,1)$  population. Let  $\bar{X}$  and  $S^2$  denote the sample mean and the sample variance. Then the probability  $P\left(-1.833 \frac{S}{\sqrt{10}} < \bar{X} < 2.262 \frac{S}{\sqrt{10}}\right)$  is equal to

- a. 0.425  
 b. 0.275  
 c. 0.925  
 d. 0.950

- a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

10)

1 point

The mean and variance of 10 observations were found to be 60 and 110 respectively. Later it was discovered that an observation 80 was wrongly read as 70. The correct mean and variance are then

- a. 63 and 221  
 b. 61 and 139  
 c. 57 and 260  
 d. 47 and 141

- a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

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