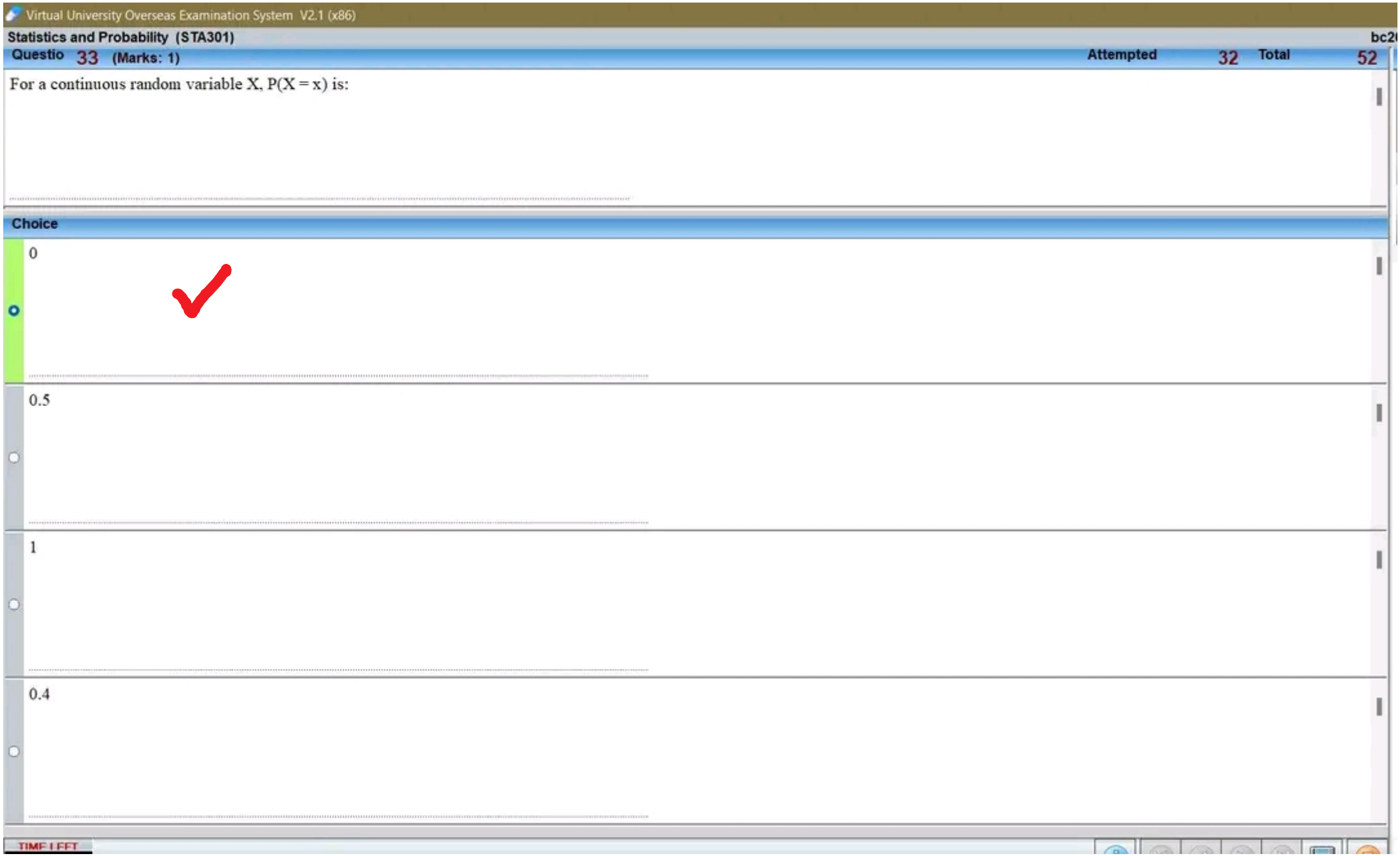
Sta301 current paper 2022 solved by masters

Masters



Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 1 (Marks: 1) Attempted 5 Total 5

The parameter of the chi- square distribution is.....

Choice

- v
- $v-1$
- $v-2$
- v -p

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 42 (Marks: 2) Attempted 42 Total 52

If a car is driven on average no more than 1600 Km per month, then formulate the null and alternative hypothesis.

Answe

The Nulll Hypothesis will be

U_o <1600 Km

The Alternative hypothesis will be

U_o >1600 Km

A null hypothesis, generally denoted by the symbol H0.
For example, suppose we think that the average height of students in all colleges is 62″. This statement
is taken as a hypothesis and is written symbolically as H0 : μ = 62″. In other words, we hypothesize that μ = 62″

alternative hypothesis denoted by H1 or HA
For example, if our null hypothesis is H0 : μ = 62″, then our alternative hypothesis may be H1 : μ ≠ 62″ or H1 : μ < 62″.

Null hypothesis
H0 : μ = 1600KM
Alternative hypothesis
H1 : μ ≠ 1600Km or
H1 : μ < 1600km .

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Question 40 (Marks: 1) Attempted 40 Total 52

If you draw all possible samples from some population, calculate the mean for each of the sample and construct the probability distribution of the sample means, what would you have?

Choice

- A population distribution
- A sample distribution
- A sampling distribution
- A parameter distribution

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 36 (Marks: 1) Attempted 37 Total 52

For a normal distribution with μ=55 and $\sigma = 10$, how much area will be found under the curve to the right of X=55?

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Choice

1.0

0.68

0.5

0.32

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 34 (Marks: 1) Attempted 33 Total 52

All hypothesis tests start with

Choice

- A null hypothesis ✓
- Alternative hypotheses
- Test statistic
- Type-I Error

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 31 (Marks: 1) Attempted 30 Total 52

A 95% confidence interval for population proportion p is 32.4% to 47.6%, the value of sample proportion is:

Choice

- 40%
- 32.4%
- 47.6%
- 80%

TIME LEFT 109

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 27 (Marks: 1) Attempted 26 Total 52

In a binomial experiment the total number of trials are:

Choice

- Fixed in advance ✓
- Changeable according to situation
- Unpredictable
- Not independent

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 25 (Marks: 1) Attempted 24 Total 52

Suppose there are 5 treatments with 4 blocks in a randomized completed block design. What are the degrees of freedom for blocks?

If the experimental design has k treatments and b blocks, the interaction degrees of freedom are equal to (k-1)(b-1).

for block b-1 , 4-1=3

for treatments k-1

Choice

2

1

3 ✓

4

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 23 (Marks: 1) Attempted 22 Total 5

In case of a 3×3 contingency table what is the value of degrees of freedom?

in the case of a 2 x 3 contingency table, there exist (2 - 1) (3 - 1) = 2 degrees of freedom

Choice

2

4 ✓

3-1x3-1
2x2
4

6

9

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 20 (Marks: 1) Attempted 19 Total 52

If $\bar{X}$ is the mean of the n observations, then which test statistic will be used to calculate the confidence limits of the population variance σ^2 ?

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Choice

Z-statistic

T-statistic

χ^2 -statistics

F-statistics

TIME LEFT

Statistics and Probability (STA301)

Questio 16 (Marks: 1) Attempted 16 Total 52

For $\alpha = 0.01$, the critical values of z for two tailed test are equal to

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Choice

-2.58 and +2.58

-2.33 and +2.33

2%

a=0.02

-1.645 and +1.645

a=0.05

-1.96 and + 1.96

a=0.01

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 12 (Marks: 1) Attempted 11 Total 52

In interval estimation, we always get:

Choice

- Single value
- Two values
- Range of values ✔
- Zero

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Statistics and Probability (STA301) bc20

Questio 10 (Marks: 1) Attempted 9 Total 52

A randomly selected sample of 400 students at university was asked whether or not they will participate in politics. Forty-six percent of the 400 student surveyed answered "yes". Which one of the following statement about number 46% is correct?

Choice

- It is a sample statistic. ✓
- It is a population parameter.
- It is a margin of error.
- It is a standard error.

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 9 (Marks: 1) Attempted 8 Total 52

When the random variable X and Y are independent then their co-variance is:

Choice

One

Negative

Zero ✓

Positive

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Question 2 (Marks: 1) Attempted 5 Total 52

The F-distribution always ranges from:

Choice

0 to 1

0 to -∞

-∞ to +∞

0 to +∞

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 3 (Marks: 1) Attempted 5 Total 52

Which of the following is true for the Poisson distribution:

Choice

- mean > variance
- mean < variance
- mean = variance ✓
- mean= standard deviation

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 4 (Marks: 1) Attempted 5 Total 52

In a one-way ANOVA:

Choice

- The interaction term has (c - 1)(n - 1) degrees of freedom
- An interaction term is given
- An interaction effect can be tested
- There is no interaction term ✓

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 5 (Marks: 1) Attempted 5 Total 52

Which one of the following assumptions is not a requirement for ANOVA?

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Choice

- Dependent samples ✓
- Normal populations
- random samples
- Independent samples

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 8 (Marks: 1) Attempted 9 Total 52

In the case of the sampling distribution of $\bar{X}$, the finite population correction factor (fpc) is:

Choice

$\sqrt{\frac{n-N}{N-1}}$

$\sqrt{\frac{N-1}{N-n}}$

$\sqrt{\frac{N-n}{N-1}}$ ✓

$\sqrt{\frac{N-n}{N}}$

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Question 6 (Marks: 1) Attempted 5 Total 52

The degrees of freedom for a t-test with sample size 6 is:

$= n - 1$

Choice

1

3

5 ✓

7

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 7 (Marks: 1) Attempted 6 Total 52

Under what condition would you use the paired t-test?

Choice

When there is a single sample of data

When the two samples of data are independent

When the two samples of data are not independent

When there are two proportions

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 11 (Marks: 1) Attempted 10 Total 52

If f (x, y) is bivariate probability density function of continuous random variables X and Y then marginal density function of y i.e. $h(y)$ is:

Choice

- $\int_{-\infty}^{\infty} f(x,y)\,dx$
- $\int_{-\infty}^{\infty} f(x,y)\,dy$
- $\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(x,y)\,dx\,dy$ ✓
- $\int_{a}^{b}\int_{c}^{d} f(x,y)\,dy\,dx$

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc20

Questio 14 (Marks: 1) Attempted 13 Total 52

The critical region for $H_1 : \mu > \mu_0 \; when \; \alpha = 0.01$ is:

Choice

- $z > z_{0.01}$
- $|z| > z_{0.01}$
- $z < -z_{0.05}$
- $|z| > z_{0.05}$

TIME LEFT

$$S^2 = \frac{\Sigma(x-\bar{x})^2}{n}$$

The sample variance is:

Choice

- Unbiased estimator of σ^2
- Biased estimator of σ^2
- Unbiased estimator of μ
- Biased estimator of μ

Questio 15 (Marks: 1) Attempted 15 Total 52

Which one is the formula for calculating the variance of the t-distribution?

Choice

- $\sigma^2 = \sqrt{\frac{\nu}{\nu-2}}$
- $\sigma^2 = \frac{\nu^2}{\nu-2}$
- $\sigma^2 = \frac{\nu}{\nu-1}$
- $\sigma^2 = \frac{\nu}{\nu-2}$ ✓

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 17 (Marks: 1) Attempted 16 Total 52

Which one of the formula will be used to find out the confidence interval for μ, when population variance unknown and sample size is large?

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Choice

- $\bar{x} \pm Z_{\alpha/2} \frac{s}{\sqrt{n}}$
- $\bar{x} \pm t_{\alpha/2(v)} \frac{s}{\sqrt{n}}$
- $\bar{x} \pm t_{\alpha/2(v)} \frac{\sigma}{\sqrt{n}}$
- $\bar{x} \pm Z_{\alpha/2} \frac{s}{\sqrt{n-1}}$

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 18 (Marks: 1) Attempted 18 Total 52

The proportion of males in Pakistan is at least 0.48, the alternative hypothesis H_1 is

Choice

- $P \leq 0.48$
- $P = 0.48$
- $P < 0.48$ ✓
- $P \geq 0.48$

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Next Question

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 19 (Marks: 1) Attempted 18 Total 52

The proportion of working females in Pakistan is at most 0.30, the alternative hypothesis.

Choice

- $P < 0.30$ ✓
- $P = 0.30$
- $P \leq 0.30$
- $P > 0.30$

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc20

Questio 21 (Marks: 1) Attempted 20 Total 52

To find the confidence interval for the ratio of two variances, we use

Choice

- F-Distribution
- Z-Distribution
- Chi-square-Distribution
- t-Distribution

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 22 (Marks: 1) Attempted 21 Total 52

In case of a 2×3 contingency table what is the value of degrees of freedom?

Choice

1

2

5

6

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 24 (Marks: 1) Attempted 23 Total 52

The Chi- Square distribution is continuous distribution ranging from:

Choice

- $-\infty \leq \chi^2 \leq \infty$
- $-\infty \leq \chi^2 \leq 1$
- $-\infty \leq \chi^2 \leq 0$
- $0 \leq \chi^2 \leq \infty$ ✓

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Question 26 (Marks: 1) Attempted 25 Total 52

What is the shape of t-distribution?

Choice

- Bell shaped
- J shaped
- U shaped
- T shaped

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 29 (Marks: 1) Attempted 28 Total 52

For any two estimators T1 and T2, if VAR(T1) < VAR(T2), then T1 is:

Choice

- Unbaised
- Sufficient
- Efficient
- Consistent

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 28 (Marks: 1) Attempted 27 Total 52

Which of the following is true for the binomial distribution b(x; n, p):

Choice

- mean > variance
- mean < variance
- mean = variance
- mean= standard deviation

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 30 (Marks: 1) Attempted 29 Total 52

A 99% confidence interval fot the population mean μ is determined to be(65.32 to 73.54). If the confidence level is reduced to 90% the confidence interval forμ

Choice

- Become wider
- Become narrower
- Remains unchanged
- None of these

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc20

Questio 31 (Marks: 1) Attempted 31 Total 52

A 95% confidence interval for population proportion p is 32.4% to 47.6%, the value of sample proportion is:

Choice

- 40%
- 32.4%
- 47.6%
- 80%

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 32 (Marks: 1) Attempted 31 Total 52

If μ3 = 0.08 and μ2 = 2.64, then the skewness of the distribution will be:

$$\beta_1 = \frac{(\mu_3)^2}{(\mu_2)^3}$$

Choice

- 2.5
- 0.87
- 0.000348
- 1.5

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc2

Questio 35 (Marks: 1) Attempted 34 Total 52

A hyper geometric random variable is a

Choice

- Independent variable
- Continuous random variable
- Discrete random variable
- Variable

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 37 (Marks: 1) Attempted 37 Total 5

In a normal distribution $N(\mu,\sigma^2)$, mean deviation is equal to

Choice

- 0.5σ
- 0.6745σ
- 0.7979σ
- 1.5σ

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 38 (Marks: 1) Attempted 38 Total 52

If X represents the number of units having the specified characteristic and N is the size of the population, then population proportion p is equal to:

Choice

- X/n
- N/X
- X/N
- σ^2 / n

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 39 (Marks: 1) Attempted 38 Total 52

How the standard error is decreased :

Choice

By decreasing the sample size

By decreasing the mean

By increasing the standard deviation

By increasing the sample size

TIME LEFT

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301) bc

Questio 41 (Marks: 2) Attempted 42 Total 52

If there are K treatments and R rows in a Randomized Complete Block Ddesign then calculate the total number of experimental units used.

Answe

If there are K treatments and R rows in a Randomized Complete Block Ddesign then calculate the total number of experimental units used

*total number of experimental units=K*R*

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Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 44 (Marks: 2) Attempted 46 Total 52

What are the mean and variance of binomial distribution?

Answe

Mean of the Binomial distribution is given by

$E(X)$ which is given by the sum of values which are the result of multiplication of x with $\int x$

whereas variance is given by

Vac =

E(X)= np

VAR(X)= npq

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Statistics and Probability (STA301)

Questio 43 (Marks: 2) Attempted 42 Total 52

From the following joint probability distribution, find h(1).

x / y	2	4	h(y)
1	0.10	0.15	

Answe

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From the following joint probability distribution, find h(1).

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x / y	2	4	h(y)
1	0.10	0.15	1.25
3	0.20	0.30	3.5
5	0.10	0.15	5.25
g(x)	0.4	0.6	10

h(1) for the above table is

h(1) = 1+0.10+0.15

h(1=1.25 Ans

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 45 (Marks: 3) Attempted 46 Total 52

Construct 95% confidence interval for the difference in means $\mu_1 - \mu_2$ in case of paired observations, where

$\bar{d} = -4.8$, $s_d = 1.32$, $t_{0.025(24)} = 2.0639$

Answe

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Construct 95% confidence interval for the difference in means $\mu_1 - \mu_2$ in case of paired observations, where

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$\bar{d} = -4.8$, $s_d = 1.32$, $t_{0.025(24)} = 2.0639$

For the above observations the confidence interval will be

Let T_1 and T_2 are two unbiased estimators. The variances of both estimators are given below:

$$V(T_1)=\frac{11\sigma^2}{9} \quad and \quad V(T_2)=\frac{13\sigma^2}{9}$$

Answe

Let T_1 and T_2 are two unbiased estimators. The variances of both estimators are given below:

$$V(T_1)=\frac{11\sigma^2}{9} \quad and \quad V(T_2)=\frac{13\sigma^2}{9}$$

For final estimation, we want to use an *efficient* estimator. Between the two, which estimator is more efficient and why?

The first estimator is more efficent as it will give us less varainces then the second one as it is using a multiplication factor of 13

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 52 (Marks: 5) Attempted 52 Total 52

find n and q.

b) The incident of occupational disease is such that the workers have 30 percent (P =30/100) chance of suffering from 6 workers. Find P (X=4).

Answe

$$P(X = x) = C_x^5 \left(\frac{3}{11}\right)^x \left(\frac{4}{11}\right)^{n-x}$$

a) From the given binomial probability distribution , find n and q.

b) The incident of occupational disease is such that the workers have 30 percent P =30/100) chance of suffering from 6 workers. Find P (X=4).

n=3 *q= 4/11*

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 51 (Marks: 5) Attempted 52 Total 5

Let x and y are two independent r.v.'s with joint pdf.

$$f(x,y) = \frac{x(1+3y^2)}{4}, \quad 0 < x < 2, 0 < y < 1$$

$= 0,$ elsewhere.

Answe

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Let x and y are two independent r.v.'s with joint pdf.

$$f(x,y) = \frac{x(1+3y^2)}{4}, \quad 0 < x < 2, 0 < y < 1$$

$= 0,$ elsewhere.

page200 example

a. Show that marginal pdf of X is

$g(x) = \frac{x}{2}$; for $0 < x < 2$

b. Also calculate $E(X)$.

Virtual University Overseas Examination System V2.1 (x86)

Statistics and Probability (STA301)

Questio 50 (Marks: 5) Attempted 52 Total

A random sample of 10 university professors gave their salaries (in thousand Rs.) 13, 11, 19, 15, 22, 20, 14, 17, 14, 15.Another random sample of 5 college professors gave their salaries (in thousand Rs.) 9, 12, 8, 10, 16. Calculate the value of pooled estimator S_p.

Answe

A random sample of 10 university professors gave their salaries (in thousand Rs.) 13, 11, 19, 15, 22, 20, 14, 17, 14, 15.Another random sample of 5 college professors gave their salaries (in thousand Rs.) 9, 12, 8, 10, 16. Calculate the value of pooled estimator S_p.

solution on next page

Masters

$$Sp = \frac{(n_1-1)(s_1^2)+(n_2-1)(s_2^2)}{n_1+n_2-2}$$

Sample 1 :

$$\bar{X} = \frac{13+11+19+15+22+20+14+17+14+15}{10}$$

$$= \frac{160}{10} = 16$$

$(X-\bar{X})^2$

X	$X-\bar{X}$	$(X-\bar{X})^2$	X	$X-\bar{X}$	$(X-\bar{X})^2$
13	3	9	20	4	16
11	5	25	14	2	4
19	3	9	17	1	1
15	1	1	14	2	4
22	6	36	15	1	1

$$\Sigma(X-\bar{X})^2 = 9+25+9+1+36+16+4+1+4+1$$

$$= 105$$

$$s_1^2 = \frac{\Sigma(X-\bar{X})^2}{n_1-1}$$

$$= \frac{105}{10-1} = \frac{105}{9} = 11.67$$

Sample 2:-

$$\bar{X} = \frac{\Sigma X}{n}$$

$$= \frac{9+12+8+10+16}{5} = \frac{55}{5} = 11$$

$\Sigma (X - \bar{X})^2$

X	$X - \bar{X}$	$(X - \bar{X})^2$
9	2	4
12	1	1
8	3	9
10	1	1
16	5	25

$\Sigma (X - \bar{X})^2 = 40$

$$S_2^2 = \frac{\Sigma (X - \bar{X})^2}{n_2 - 1}$$

$$= \frac{40}{5-1} = \frac{40}{4} = 10$$

Put all the value in the form

$$S_p = \frac{(n_1 - 1) S_1^2 + (n_2 - 1) S_2^2}{n_1 + n_2 - 2}$$

$$= \frac{(10-1)(11.67) + (5-1)10}{10+5-2}$$

$$= \frac{(9)(11.67) + (4)10}{13} = \frac{145.03}{13} = 11.16$$