

Describe the formula for hypergeometric distribution? 2 marks

Answer:- Rep

What is graphical representation? 2 marks

Answer:-

The plot of the points in the plane which constitute the graph of a given real function or a pictorial diagram depicting interdependence of variables.

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

What is the t formula for paired distribution? 3marks.

Answer:- (Page 302)

$$t = \frac{\bar{d} - \mu_d}{s_d / \sqrt{n}}$$

What is the probability that at least one head occurs if a coin tossed 6 times successively? 5 marks

Answer:-

$$\begin{aligned} P(X=1) &= \binom{6}{1} \cdot \left(\frac{1}{2}\right)^1 \cdot \left(\frac{1}{2}\right)^{6-1} \\ &= \binom{6}{1} \cdot \left(\frac{1}{2}\right)^1 \cdot \left(\frac{1}{2}\right)^5 \\ &= 3.03 \end{aligned}$$

Find first 2 moments for function with respect to mean? 5 marks

Answer:- (Page 192)

16) From the table given below find the value of chi square

Observation Frequency O _{ij}	Expected Frequency E _{ij}
120	100
130	150
80	100
170	150

Answer:- Rep

Q no 5

Suppose that we toss a fair coin three times. what is the sample space? marks :2

Answer: Rep

بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

Compute the following formula which is used to find the sample size.

$$n = \left(\frac{Z_{\alpha/2}}{e} \right)^2$$

Page 276

Question No: 31 (Marks: 2)

What is the mean and variance of Poisson distribution?

Answer:- (Page 233)

If the random variable X has a Poisson distribution with parameter μ , then its mean and variance are given by $E(X) = \mu$ and $Var(X) = \mu$.

Question No: 32 (Marks: 2)

Explain the Chi-square test of goodness of fit.

Answer:- (Page 332)

The chi-square test of goodness-of-fit is a test of hypothesis concerned with the comparison of observed frequencies of a sample, and the corresponding expected frequencies based on a theoretical distribution.

Question No: 33 (Marks: 2)

Define level of significance?

Answer:- Rep

Question No: 34 (Marks: 3)

Find the value of F(table value), when $n_1 = 7$, $n_2 = 10$ and $\alpha = 0.05$

Answer:- (Page 316)

Question No: 35 (Marks: 3)

Define Null and Alternative hypothesis.

Answer:- Rep

خوبصورتی علم و ادب سے ہوتی ہے لباس و حسن سے نہیں

Question No: 36 (Marks: 3)

A random sample of 100 is taken from a population with mean 30 and standard deviation 5. The probability distribution of the parent population is unknown, find the mean and standard error of the sampling distribution of $\bar{X}$.

Question No: 37 (Marks: 5)

What is the probability that a poker hand of 5 cards contain exactly 2 aces (hypergeometric distribution)?

Answer:- Rep

Question No: 38 (Marks: 5)

A random sample of size n is drawn from normal population with mean 5 and variance σ^2 .

If $n=25$, $s=10$ and $t=2$, what is the values of $\bar{x}$?

Question No: 39 (Marks: 5)

Describe the main steps of General Procedure for Testing Hypothesis.

Answer:- (Page 281)

Step-1:

Formulation of the Null and Alternative Hypotheses:

Step-2:

Decision Regarding the Level of Significance

Step-3:

Test Statistic (that statistic that will enable us to test our hypothesis):

Step-4:

Calculations:

Step-5:

Critical Region (that portion of the X-axis which compels us to reject the null hypothesis):

Step-6:

Conclusion:

Question No: 31 (Marks: 2)

How many parameters are involved in hyper geometric distribution?

Answer:- (Page 291)

The hyper geometric probability distribution has three parameters N , n and k .

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

Question No: 32 (Marks: 2)

If an automobile is driven on the average no more than 16000 Km per year, then formulate the null and alternative hypothesis.

Answer:- Rep

Question No: 33 (Marks: 2)

Write down the test statistic when chi- square goodness of fit test is performed.

Answer:- (Page 334)

$$\chi^2 = \sum_i \frac{(o_i - e_i)^2}{e_i}$$

Question No: 34 (Marks: 3)

Find the value of F(table value), when $n_1 = 7$, $n_2 = 10$ and $\alpha = 0.05$

Answer:- (Page 316)

$$F_{0.05}(n_1-1, n_2-1) = (6,9) = 3.37$$

$$F_{0.05}(n_2-1, n_1-1) = (9,6)$$

$$V_2=6, v_1=8 \Rightarrow 4.15,$$

$$V_2=6, v_1=12 \Rightarrow 4.00$$

$$\text{Mean} = (4.15+4)/2 = 4.075$$

$$\text{Hence value of } F_{0.05}(9,6) = 4.075$$

Question No: 35 (Marks: 3)

If $X = 327$, $n = 634$, $p_0 = 0.50$ then find the z-test statistic for proportion.

Answer:- (Page 289)

$$Z = \frac{X \pm \frac{1}{2} - np_0}{\sqrt{np_0(1-p_0)}}$$

$$np_0 = 634 * 0.50 = 317$$

here $X > np_0$ therefore we use $X - \frac{1}{2}$

$$Z = \frac{X - \frac{1}{2} - np_0}{\sqrt{np_0(1-p_0)}}$$

$$Z = \frac{327 - \frac{1}{2} - 317}{\sqrt{317(1-0.50)}}$$

$$Z = \frac{9.5}{12.58}$$

$$Z = 0.75$$

Question No: 36 (Marks: 3)

If population proportions are given as:

$$P_1 = 0.30, P_2 = 0.20.$$

Find $\sigma_{\hat{p}_1 - \hat{p}_2}^2$, where $n = 10$

Answer:- (Page 256)

$$\sigma_{\hat{p}_1 - \hat{p}_2}^2 = \frac{P_1 q_1}{n_1} + \frac{P_2 q_2}{n_2}$$

$$q_1 = 1 - p_1 \Rightarrow 1 - 0.30 = 0.7$$

$$q_2 = 1 - p_2 \Rightarrow 1 - 0.20 = 0.8$$

$$\begin{aligned}\sigma_{\hat{p}_1 - \hat{p}_2}^2 &= \frac{(0.30)(0.7)}{10} + \frac{(0.20)(0.80)}{10} \\ &= 0.021 + 0.016 \\ &= 0.037\end{aligned}$$

Question No: 37 (Marks: 5)

A candidate for mayor in a large city believes that he appeals to at least 10 per cent more of the educated voters than the uneducated voters. He hires the services of a poll-taking organization, and they find that 62 of 100 educated voters interviewed support the candidate, and 69 of 150 uneducated voters support him at the 0.05 significance level.

Answer:- (Page 292)

Step-1:

The null and alternative hypothesis is

$H_0 : p_1 - p_2 > 0.10$, and

$H_1 : p_1 - p_2 < 0.10$, where p_1 = proportion of educated voters, and p_2 = proportion of uneducated voters.

Step-2:

Level of Significance:

$$\alpha = 0.05.$$

انسان کے لئے بری صحبت سے بڑھ کر بری کوئی چیز نہیں

Step-3:

Test Statistic:

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0.10}{\sqrt{\frac{\hat{p}_1 \hat{q}_1}{n_1} + \frac{\hat{p}_2 \hat{q}_2}{n_2}}}$$

which for large sample sizes, is approximately standard normal.

Step-4:

Computation:

Here $\hat{p}_1 = \frac{62}{100} = 0.62$, so that $\hat{q}_1 = 0.38$,

$$\hat{p}_2 = \frac{69}{150} = 0.46, \text{ so that } \hat{q}_2 = 0.54.$$

$$\begin{aligned} \text{Thus } z &= \frac{(0.62 - 0.46) - 0.10}{\sqrt{\frac{(0.62)(0.38)}{100} + \frac{(0.46)(0.54)}{150}}} \\ &= \frac{0.06}{\sqrt{0.002356 + 0.001656}} = \frac{0.06}{0.063} = 0.95. \end{aligned}$$

Step-5:

Critical Region:

As this is a one-tailed test, therefore the critical region is given by

$$Z < -z_{0.05} = -1.645$$

Step-6:

Conclusion:

Since the calculated value $z = 0.95$ does not fall in the critical region, so we accept the null hypothesis $H_0 : p_1 - p_2 > 0.10$. The data seems to support the candidate's view.

Until now, we have discussed in considerable detail interval estimation and hypothesis-testing based on the standard normal distribution and the Z-statistic.

Next, we begin the discussion of interval estimation hypothesis-testing based on the t-distribution.

خاموشی غصے کا بہترین علاج ہے

Question No: 38 (Marks: 5)

If we have RCBD with MSE=3.19, no.of.treatments = 4, no.of.blocks = 5; then find the value of LSD (least significant difference) for treatments by using $\alpha=0.05$ and error degrees of freedom is 12.

Answer:- Rep

Question No: 39 (Marks: 5)

Find the mean and variance for the sampling distribution given below.

$(\hat{p})$	No. of Samples	Probability $f(\hat{p})$
0	1	1/20
1/3	9	9/20
2/3	9	9/20
1	1	1/20
Σ	20	1

Answer:- Rep

Question No: 31 (Marks: 2)

Define normal distribution.

Answer:- (Page 226)

A continuous random variable is said to be normally distributed with mean μ and standard deviation σ if its probability

density function is given by

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left[\frac{x-\mu}{\sigma}\right]^2}$$

Question No: 32 (Marks: 2)

Fill up the missing values in the formula.

$$n = \frac{(\frac{z}{\alpha/2})^2 \hat{p}q}{\quad}$$

جھوٹ رزق کو کھا جاتا ہے

Answer:- (Page 277)

$$n = \frac{(z_{\alpha/2})^2 \hat{p} \hat{q}}{e^2}$$

Question No: 33 (Marks: 2)

Explain the Chi-square test of goodness of fit.

Answer:- Rep

Question No: 34 (Marks: 3)

What is natural pairing in observations? Also give an example.

Answer:- Rep

Question No: 35 (Marks: 3)

If population proportions are given as:

$$P_1 = 0.30, P_2 = 0.20.$$

$$\sigma^2_{\hat{p}_1 - \hat{p}_2}$$

Find , where $n = 10$

Answer:- Rep

Question No: 36 (Marks: 3)

Explain the method of Maximum Likelihood in Point Estimation?

Answer:- Page 263

The method of maximum likelihood is regarded as the *MOST important* method of estimation, and is the *most* widely used method. This method was introduced in 1922 by Sir Ronald A. Fisher (1890-1962). The mathematical technique of finding Maximum Likelihood Estimators is a bit *advanced*, and involves the concept of the Likelihood Function.

Question No: 37 (Marks: 5)

The following data was obtained for a randomized block design involving five treatments and three blocks
 $SST=430$, $SSTR=310$, $SSB=85$, Setup the ANOVA table.

Answer:- (Page 332)

Source	d.f	SS	MS
Between treatments	4	430	107.5
Between Blocks	2	85	42.5
Error	8	310	38.75
Total	14	825	188.75

Question No: 38 (Marks: 5)

In a Standard Normal Distribution, find:

Mean and Standard Deviation

Lower Quartile

Upper quartile

Inter-quartile range

Mean Deviation

Answer:-

In normal distribution

i. Mean and Standard Deviation

Mean is 0 and S.D is 1

ii. Lower Quartile:

$$Q_1 = \mu - 0.6745\sigma$$

$$= 0 - 0.6745(1)$$

$$Q_1 = -0.6745$$

iii. Upper Quartile:

$$Q_3 = \mu + 0.6745\sigma$$

$$= 0.6745$$

iv. Inter-quartile range

$$Q_3 - Q_1 / 2 = 0.6745 - (-0.6745) / 2 = 0.6745$$

v. Mean Deviation

$$= 0.7979\sigma$$

$$= 0.7979(1)$$

$$= 0.7979$$

Question No: 39 (Marks: 5)

$$n = 13, \bar{x} = 34, \sigma^2 = 70, \alpha = 0.10$$

If

Test the hypothesis $\mu > 31$

افضل انسان وہ ہے جو اپنی اصلاح کی کوشش کرتا ہے

Answer:-

$$H_0 = \mu = 30$$

$$H_1 = \mu > 30$$

Level of significance $\alpha = 0.10$

$$\alpha / 2 = 0.05$$

Critical region = $z > 1.645$

$$z = \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$Z = \frac{34 - 31}{2.32}$$

$$Z = 1.29$$

Conclusion: Since the value $Z = 1.29$ is less than the value of critical region so we accepted H_0 at 0.10 Level of significance.

اطمینان قلب چاہتے ہو تو حد سے دور رہو