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1- A sample of size n=3 drawn without replacement experiment from a population N=5 items whose values 0,2,3,6,7 draw possible samples

Answer:-

Sample without replacement $= \binom{N}{n} = \binom{5}{3} = 10$

(0,2,3), (0,2,6), (0,2,7), (0,3,6), (0,3,7), (0,6,7), (2,3,6), (2,3,7), (2,6,7), (3,6,7).

2- Calculate sampling error if sample mean is 102 and population mean is 100

Answer:- (Page 14)

Sampling error $= \overline{X} - \mu$

$= 102 - 100$

$= 2$

3- Define Unbiased estimator

Answer:- (Page 258)

An estimator is defined to be unbiased if the statistic used as an estimator has its expected value equal to the true value of the population parameter being estimated. $E(\hat{\theta}) = \theta$

4- Quartile deviation

Answer:- (Page 84)

The quartile deviation is defined as half of the difference between the third and first quartiles.

$$Q.D = \frac{Q_3 - Q_1}{2}$$

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

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Q1.decribe about significance level
Answer:
The significance level is the criterion used for rejecting the null hypothesis. It show you how likely a result is due to chance. The most frequently used values of α, the significance level, are 0.05 and 0.01, i.e. 5 percent and 1 percent.

Q2 .discuss about center limit theorem
Answer:- (Page 243)
"If a variable X from a population has mean μ and finite variance σ/2, then the sampling distribution of the sample mean–X approaches a normal distribution with mean μ and variance σ2/n as the sample size n approaches infinity."

Q3. What is difference between constant and random variable
Answer:
A variable whose value cannot be changed once it has been assigned a value while those variable whose values changes when we assign value to it.

Q: Define an Un-Biased estimator? 2 Marks
Answer: Rep

Q: Briefly Explain an experiment design? 2 Marks
Answer:- (Page 320)
By an experimental design, we mean a plan used to collect the data relevant to the problem under study in such a way as to provide a basis for valid and objective inference about the stated problem.

Q: Define an independent and dependent variable in regression? 2 Marks
Answer:- (Page 121)
In regression Y represents the dependent variable and X represents the independent variable

بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

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Find the mean and variance for the sampling distribution given below. 5 Marks

$(\hat{p})$	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:- (Page 247)

$\hat{p}$	No. of samples	$f(\hat{p})$	$\hat{p}.f(\hat{p})$	$\hat{p}^2.f(\hat{p})$
0	1	$\frac{1}{20}$	0	0
$\frac{1}{3}$	9	$\frac{9}{20}$	$\frac{3}{20}$	$\frac{1}{20}$
$\frac{2}{3}$	9	$\frac{9}{20}$	$\frac{3}{10}$	$\frac{1}{5}$
1	1	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$
$\sum$	20	1	$\sum \hat{p}.f(\hat{p}) = \frac{1}{2}$	$\sum \hat{p}^2.f(\hat{p}) = \frac{3}{10}$

$$\mu_{\hat{p}} = \sum \hat{p}.f(\hat{p}) = \frac{1}{2} = 0.5$$

$$\sigma^2_{\hat{p}} = \sum \hat{p}^2.f(\hat{p}) - \left[\sum \hat{p}.f(\hat{p})\right]^2$$

$$= \frac{3}{10} - \left[\frac{1}{2}\right]^2$$

$$= \frac{3}{10} - \frac{1}{4}$$

$$= \frac{1}{20} = 0.05$$

اللہ کا خوف سب سے بڑی دانائی ہے

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What is the difference between an outcome and an event? (2)
Answer:- (Page 145)
An outcome is a result of a single trial of an experiment while an event is an individual outcome or any number of outcomes.

The mean of a Poisson distribution is 5 while its standard deviation is 4. Comment on it (2)
Answer:- (Page 223)
In Poisson distribution mean and variance are always equal but this statement is not satisfying this property of Poisson distribution.

If an automobile is driven on the average no more than 16000 Km per year, then formulate the null and alternative hypothesis. (2)
Answer:
$H \leq 16000$
$H1 > 16000$

Q: Discuss three properties of normal distribution? 3 Marks
Answer:- (Page 227)
Normal distribution is absolutely symmetrical, hence , μ_3 the third moment about the mean is zero
The normal curve is asymptotic to the x-axis as $x \to \pm \infty$.
For the normal distribution, it can be mathematically proved that $\mu_4 = 3\sigma_4$

Q: The 90% confidence interval for the population mean is 11 to 20, interpret this result? 3 Marks
Answer: - We are 90% sure that our Population mean lie between 11 – 20.

Q: Define LSD test? 3 Marks
Answer:- (Page 330)
According to this procedure, we compute the smallest difference that would be judged significant, and compare the absolute values of all differences of means with it. This smallest difference is called the least significant difference or
LSD. And is given by

$$LSD = t_{\frac{\alpha}{2},(v)}\sqrt{\frac{2(MSE)}{r}}$$

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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How many parameters are associated with F- distribution and what is the range of the distribution? (3)
Answer:- (Page 312)
It has two parameters v1 and v2 which are known as the degrees of freedom and it ranging from zero to plus infinity.

Which of the following statement represents continuous data and discrete data? (5)
i) Number of shopes in a plaza. **Discrete data**
ii) Hourly temperature recorded by whether bureau. **Continuous data**
iii) Inches of rainfall in a city. **Continuous data**
iv) Number of passengers carried by rail every year. **Discrete data**
v) Height measurements of boys studying in a college. **Discrete data**

If the population proportions are gives as: P1 = 0.4, P2 = 0.20
find sigma^2 P-hat 1 - P-hat 2 , where n = 12.
Answer:- (Page 256)

$$\sigma_{p1-p2} = \frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}$$

$$q_1 = 1 - p_1 \Rightarrow 1 - 0.40 = 0.6$$

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

$$\sigma_{p1-p2} = \frac{(0.4)(0.6)}{10} + \frac{(0.20)(0.80)}{10}$$

$$= 0.024 + 0.016$$

$$= 0.04$$

what are steps involved in statistical research
Answer: (Page 11)
STEPS INVOLVED IN ANY STATISTICAL RESEARCH
- Topic and significance of the study
- Objective of your study
- Methodology for data-collection
  - Source of your data
  - Sampling methodology
  - Instrument for collecting data

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

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Q. (Marks 5)Two different dice are thrown. Make the sample space and also find the number of sample points in an even A that the sum is 7.

Answer:-

$$S = \begin{pmatrix} (1,1) & (2,1) & (3,1) & (4,1) & (5,1) & (6,1) \\ (1,2) & (2,2) & (3,2) & (4,2) & (5,2) & (6,2) \\ (1,3) & (2,3) & (3,3) & (4,3) & (5,3) & (6,3) \\ (1,4) & (2,4) & (3,4) & (4,4) & (5,4) & (6,4) \\ (1,5) & (2,5) & (3,5) & (4,5) & (5,5) & (6,5) \\ (1,6) & (2,6) & (3,6) & (4,6) & (5,6) & (6,6) \end{pmatrix}$$

$$A = \{(1,6) \quad (2,5) \quad (3,4) \quad (4,3) \quad (5,2) \quad (6,1)\}$$

Q. (Marks 2) Define the error sample and also write its formula.

Answer:- (Page 13)

The difference between the estimate derived from the sample (i.e. the statistic) and the true population value (i.e. the
parameter) is technically called the sampling error

Sampling error $= \overline{X} - \mu$

Q. (Marks 2) Properties of hyper geometric distribution.

Answer:- (Page 218)

- The outcomes of each trial may be classified into one of two categories, success and failure.
- The probability of success changes on each trial.
- The successive trials are not independent.
- The experiment is repeated a fixed number of times

5 number summery

Answer:- (Page 97)

A five-number summary consists of X0,Q1, Median, Q3, and Xm ; It provides us quite a good idea about the shape of the distribution.

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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1.what s bias?(2)
Answer:- (Page 258)
$E(\theta^{\hat{}}) \neq \theta$, the statistic is said to be a biased estimator

2.advantages and disadvantages of median?(3)
Answer:- Click here for detail
Advantages
(1) It is very simple to understand and easy to calculate. In some cases it is obtained simply by inspection.
(2) Median lies at the middle part of the series and hence it is not affected by the extreme values.
(3) In grouped frequency distribution it can be graphically located by drawing ogives.
(4) It is especially useful in open-ended distributions.
Disadvantages
(1) In simple series, the item values have to be arranged. If the series contains large number of items, then the process becomes tedious.
(2) It is a less representative average because it does not depend on all the items in the series.

3. Mathematical expectation of discrete random variable?(3)
Answer:- (Page 179)
In probability theory the expected value (or mathematical expectation) of a random variable is the sum of the product of the values within the range of the discrete random variable and their respective probabilities of occurrence.

$$E(X)=\sum_{i=1}^{n} x_i f(x_i)$$

4.any two properties of mathematical expectation?(2)
Answer:- (Page 202)
The important properties of the expected values of a random variable are as follows:
• If c is a constant, then E(c) = c. Thus the expected value of a constant is constant itself. This point can be understood easily by considering the following interesting example: Suppose that a very difficult test was given to students by a professor, and that every student obtained 2 marks out of 20! It is obvious that the mean mark is also 2. Since the variable 'marks' was a constant, therefore its expected value was equal to itself.
• If X is a discrete random variable and if a and b are constants, then E(aX + b) = a E(X) + b.

5.what s statistical test?(2)
Answer:- (Page 279)
A statistic, which provides a basis for testing a null hypothesis, is called a test-statistic. Every test-statistic has a probability distribution (i.e. sampling distribution) which gives the probability that our test-statistic will assume a value greater than or equal to a specified value OR a value less than or equal to a specified value when the null hypothesis is true.

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6. Decide a small sample and large sample?(2)

Answer:-

If the sample size 'n' is less than or equal to 30 (<=30) then it is said to be small sample, and it the sample size is larger than 30 then it is said to be large population.

10.tell the null and alternative hypothesis of 150?(2)

Answer:-

$H_o = \mu = 150$

$H_1 = \mu \neq 150$

35. In which condition, Poisson distribution is used to approximate the hyper geometric distribution?

Answer:- (Page 224)

The Poisson distribution can be used to approximate the hyper geometric distribution when $n < 0.05N$, $n > 20$, and $p < 0.05$

36. Elaborate the Least Significant Difference (LSD) test.

Answer:- Rep

37. Write down the formula of combined or pooled proportion of two samples.

Answer:- (Page 290)

$$\bar{p}_c = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2}$$

38. If approximate value of class interval is 2.96 and range = 14.8 then find the number of classes.

Answer:- (Page 29)

$$Class\ interval = \frac{range}{number\ of\ classes}$$

$$2.96 = \frac{14.8}{number\ of\ classes}$$

$$number\ of\ classes = \frac{14.8}{2.96} = 5$$

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

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40. Find the coefficient of variation (C.V) for the following price of a commodity.
Price (X): 8, 13, 18, 23, 30

Answer:-

X	X^2
8	64
13	169
18	324
23	529
30	900
$\sum X = 92$	$\sum X^2 = 1986$

$$\overline{X} = \frac{\sum X}{n} = \frac{92}{5} = 18.4$$

$$S = \sqrt{\frac{\sum X^2}{n} - \left(\frac{\sum X}{n}\right)^2}$$

$$S = \sqrt{\frac{1986}{5} - \left(\frac{92}{5}\right)^2}$$

$$S = \sqrt{397.2 - 338.56} = \sqrt{58.64} = 7.66$$

$$C.V = \frac{S}{\overline{X}} \times 100$$

$$C.V = \frac{7.66}{18.4} \times 100 = 41.63\%$$

41. Flaws in plywood occur at random with an average of one flaw per 50 square feet. What is the probability that 32 square feet will have no flaws?

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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