Q6 Brief description of z-test, t-test, chi-square test, and Anova test.

⇒ z-Test :- used to compare means when the population variance is known or the sample size is large ($n > 30$)

T-Test : used to compare means when the population variance is unknown and the sample size is small ($n < 30$)

chi-square test : used to determine if there is a statically significant association between ~~to~~ two categorical variables

Anova Test :- used to compare the means of three or more independent groups to determine if at last one group mean is significantly different from the others.

Q7. what is covariance?

⇒ covariance is a measure of the joint variability between two random variables. A positive covariance indicates that the variables tend to move in the same direction while a negative covariance indicate they tend to move in opposite directions. it is an ~~under~~ unstandardized measure, making its magnitude difficult to interpret.

Q4 Define p-value?

=> The p-value is the probability of observing a test statistic as extreme as, or more than, the one observed in the sample, assuming that the null hypothesis is true.

Q5 Differentiate type 1 and type 2 Errors?

=>

Type - 1 Errors	Type - 2 Errors
* Rejecting a true null hypothesis	* Accepting a false null hypothesis.
* controlled by significance level	* Reduced by increasing sample size.
ex. medical test. test say positive, but person is actually healthy	* ex. medical test. test say negative but person is actually sick
ex. court case. innocent person declared guilty	ex. court case. ~~Ex~~ Guilty person declared innocent.

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Q3 explain confidance interval and critical value?

⇒ confidance interval gives a range in which the true population mean is likely to lie.

we are 95% confident the true mean lies inside this range.

Formula

$$CI = \bar{X} \pm t_{\alpha/2} \times SE$$

$$CI = 26.8 \pm 1.984 \times 0.45$$

$$CI = 1.984 \times 0.45 = 0.89$$

$$CI = 26.8 \pm 0.89.$$

we are 95% confident That the true average BMI lies between 25.91 and 27.69.

critical value is a point of a scale of the Test statistic beyond which we reject the null hypothisis difining the boundry of the rejection.

Formula:-

$$t_{\alpha/2, n-1}$$

$$T_{0.025, 99} = 1.984$$

This is the cut of value
if your calculate t-statistic is greater than 1.984 the reselt is significant.

os. What is correlation?

⇒ correlation is a standardized measure of the linear relationship between two variables ranging from -1 to +1. it indicates both the strenght and direction of the linear association where a value of +1 is a perfect positive corelation and -1 is a perfect negative correlation.

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PR 3

Q1 What is inferential statistics?

⇒ inferential statistics is a branch of statistics that we a random sample of data taken from a population to describe and make inference about the population it allows for drawing conclusion that extend beyond the ~~ind~~ imediatly data alone such as testing hypothesis testing estimate population.

Q2 What is hypothisis testing?

⇒ Hypothisis Testing is a statistical method used to determine if there is enough evidence in a sample of data to infer that a certain condition is true for the entire population. its main components are the null hypothesis the alternative hypothesis the test statistic the p-value and the decision rule

Formula :-

$$T = \frac{\bar{x} - M}{S/\sqrt{n}}$$

$\bar{x}$ = sample mean.
M = population mean
S = sample standard deviation
n = sample size.

$$\frac{27.035 - 27}{4.7/\sqrt{1000}}$$

$$T = 13.68$$

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