PR 3

Q.1 what is a inferential statistics?

> Inferential statistics is a bunch of statistics That we use 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 imd imediatly data alone such as testing hypothesis testing estimate population

Q.2 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:-

$$T = \frac{\bar{X} - \mu}{s/\sqrt{n}}$$

$\bar{X}$ = sample mean.

M = population mean

S = sample standard deviation

n = sample size.

$$T = \frac{85 - 4\text{t}}{13\sqrt{1000}}$$

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

$$T = 13.68$$

Q3 - explain confidence - interval and critical value?

→ confidance interval gives a range in the true population mean is likely

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 a test statistic beyond which we reject the null hypohisis 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 result is significant

Q.4 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, s assuming that the null hypothesis is true.

Q.5 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 sic
ex. court case innocent person declared guilty	ex. court case a a Guilty person declared innocent.

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

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

T-Test used to compare means the population variance is unknown 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 mean of three or more independent group to determine if at last one group mean is significantly different from the others.

2.7 what is covariance?
=> covariance is a measure of the Joint variability between too 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 unstandardize measure, making its magnitude difficult to interpret.

5. what is correlation?

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