

TASK 10

1- Differences between probability sampling and non-probability :

Probability Sampling:

Relies on the probability of selecting individuals or elements in the sample.

The sample is chosen using random methods such as simple random sampling or multi-stage random sampling.

Statistical probability of the sample can be calculated, and the results can be generalized to the original population.

Non-probability Sampling:

Does not rely on the probability of selecting individuals or elements in the sample.

The sample is chosen using non-random methods such as purposive sampling, quota sampling, or convenience sampling.

Generalizing the results to the original population may be challenging due to the non-probabilistic nature of the selection process.

2-Statistical tests :

1. T-test: The t-test is used to compare the means of two groups and determine if there is a significant difference between them. It is commonly used when the sample size is small and the data follows a normal distribution.
2. Chi-square test: The chi-square test is used to determine if there is a significant association between two categorical variables. It compares the observed frequencies with the expected frequencies to assess if the variables are independent or related.
3. ANOVA (Analysis of Variance): ANOVA is used to compare the means of three or more groups to determine if there is a significant difference between them. It assesses the variation within and between groups to make inferences about the population means.
4. Regression analysis: Regression analysis is used to examine the relationship between a dependent variable and one or more independent variables. It helps determine the strength and significance of the relationship and can be used for prediction and modeling.

3- There are types of model Statistical and non statistical:

1. Statistical Models: Statistical models are based on statistical theory and techniques. They aim to describe and analyze the relationships between variables in a dataset. These models often involve assumptions about the underlying data distribution and use statistical inference to estimate

parameters and make predictions. Examples of statistical models include linear regression, logistic regression, time series models, and generalized linear models.

2. **Non-Statistical Models:** Non-statistical models, also known as machine learning models, are data-driven models that focus on pattern recognition and prediction. These models use algorithms to learn from data without explicitly relying on statistical theory. Non-statistical models can handle complex relationships and large datasets, making them suitable for tasks like image recognition, natural language processing, and recommendation systems. Examples of non-statistical models include decision trees, random forests, support vector machines, neural networks, and deep learning models.