Exam 2.

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1) What is the difference between a one-sample t-test and a paired t-test?**? 5 points**

One-Sample t-Test compares the average of one group to a fixed number, Paired t-Test compares the average difference between two related groups. One-sample tests compare a group to a constant; paired tests compare two related measurements.

2) What does a t-test measure? **5 points**

A t-test measures whether there is a significant difference between the means of groups or a group and a known value. It evaluates whether the observed differences are likely due to chance or reflect a true difference in the population.

3) What are z-scores and t-scores? **5 points**

 **Z-Score** measures how far a data point is from the mean when population parameters are known.

 **T-Score** measures how far a sample mean is from the population mean when the population standard deviation is unknown and the sample size is small.

4) General Properties of Probability Distributions? **5 points**

A probability distribution assigns probabilities to outcomes, ensures they sum to 1, and describes the behavior of a variable. Some distributions are discrete, others are continuous, and each has specific properties.

5) What are Types of Discrete Distributions? **5 points**

There are many types of Discrete Distribution, Bernoulli, Binomial, Geometric, Negative Binomial, Poisson, Hypergeometric, Multinomial, and Discrete Uniform Distribution.

6) Explain function dbinom(4, size=12, prob=0.2)? **5 points**

The result of dbinom(4, size=12, prob=0.2) is approximately 0.132. This means there is a 13.2% chance of observing with 4 successes in 12 trials when the probability of success per trial is 0.2.

7) What is **Poisson Distribution? 5 points**

The Poisson distribution models the likelihood of a specific number of random events occurring within a fixed time or space when you know the average rate of occurrence.

8) Explain Continuous Uniform Distribution, Chi-squared Distribution, Student t Distribution, F Distribution, Exponential Distribution, Normal Distribution with their respective R functions? 20 points

Continuous Uniform Distribution is a distribution where all values in an interval [a,b] are equally likely.Chi-Squared Distribution is used to model the sum of the squares of k independent standard normal random variables. Student's t-Distributionis used for hypothesis testing and confidence intervals when the sample size is small, and population variance is unknown. F-Distribution is used for hypothesis testing, particularly in comparing variances **Normal Distribution** symmetric, bell-shaped distribution characterized by its mean (μ) and standard deviation (σ).

9) If there are ten cars crossing a bridge per minute on average, find the probability of having seventeen or more cars crossing the bridge in a particular minute? Explain only the function. 5 points

9) Following is the R exercise question: 40 points

Read following data in R:

read.csv("https://goo.gl/j6lRXD")

Report X-squared (chi-square) and P value *without correction.*

An X-squared and P value with correction will get half points deducted!!

Save R program with your X-squared and P value as “Exam2.R” and email with this document to get full points.