Statistics Advance – 2

Assignment Questions

Question1: Define the z-statistic and explain its relationship to the standard normal distribution. How is the z-statistic used in hypothesis testing?

Question2 : What is a p-value, and how is it used in hypothesis testing? What does it mean if the p-value is very small (e.g., 0.01)?

Question3: Compare and contrast the binomial and Bernoulli distributions.

Question 4: Under what conditions is the binomial distribution used, and how does it relate to the Bernoulli distribution?

Question5: What are the key properties of the Poisson distribution, and when is it appropriate to use this distribution?

Question6: Define the terms "probability distribution" and "probability density function" (PDF). How does a PDF differ from a probability mass function (PMF)?

Question7: Explain the Central Limit Theorem (CLT) with example.

Question8: Compare z-scores and t-scores. When should you use a z-score, and when should a t-score be a pplied instead?

Question9: Given a sample mean of 105, a population mean of 100, a standard deviation of 15, and a sample size of 25, calculate the z-score and p-value. Based on a significance level of 0.05, do you reject or fail to reject the null hypothesis?
Task: Write Python code to calculate the z-score and p-value for the given data.
Objective: Apply the formula for the z-score and interpret the p-value for hypothesis testing.

Question10: Simulate a binomial distribution with 10 trials and a probability of success of 0.6 using Python. Generate 1,000 samples and plot the distribution. What is the expected mean and variance?
Task: Use Python to generate the data, plot the distribution, and calculate the mean and variance.
Objective: Understand the properties of a binomial distribution and verify them through simulation.