

# Statistics Advance-4

## Assignment Questions



**Q1:** What is the difference between a t-test and a z-test? Provide an example scenario where you would use each type of test.

**Q2:** Differentiate between one-tailed and two-tailed tests.

**Q3:** Explain the concept of Type 1 and Type 2 errors in hypothesis testing. Provide an example scenario for each type of error.

**Q4:** Explain Bayes's theorem with an example.

**Q5:** What is a confidence interval? How to calculate the confidence interval, explain with an example.

**Q6:** Use Bayes' Theorem to calculate the probability of an event occurring given prior knowledge of the event's probability and new evidence. Provide a sample problem and solution.

**Q7:** Calculate the 95% confidence interval for a sample of data with a mean of 50 and a standard deviation of 5. Interpret the results.

**Q8:** What is the margin of error in a confidence interval? How does sample size affect the margin of error? Provide an example of a scenario where a larger sample size would result in a smaller margin of error.

**Q9:** Calculate the z-score for a data point with a value of 75, a population mean of 70, and a population standard deviation of 5. Interpret the results.

**Q10:** In a study of the effectiveness of a new weight loss drug, a sample of 50 participants lost an average of 6 pounds with a standard deviation of 2.5 pounds. Conduct a hypothesis test to determine if the drug is significantly effective at a 95% confidence level using a t-test.

**Q11:** In a survey of 500 people, 65% reported being satisfied with their current job. Calculate the 95% confidence interval for the true proportion of people who are satisfied with their job.

**Q12:** A researcher is testing the effectiveness of two different teaching methods on student performance. Sample A has a mean score of 85 with a standard deviation of 6, while sample B has a mean score of 82 with a standard deviation of 5. Conduct a hypothesis test to determine if the two teaching methods have a significant difference in student performance using a t-test with a significance level of 0.01.

**Q13:** A population has a mean of 60 and a standard deviation of 8. A sample of 50 observations has a mean of 65. Calculate the 90% confidence interval for the true population mean.

**Q14:** In a study of the effects of caffeine on reaction time, a sample of 30 participants had an average reaction time of 0.25 seconds with a standard deviation of 0.05 seconds. Conduct a hypothesis test to determine if the caffeine has a significant effect on reaction time at a 90% confidence level using a t-test.

**Note:** Create your assignment in Jupyter notebook and upload it in GitHub & share that github repository link through your dashboard. Make sure the repository is public.