1) Before making a complete switch from BlackBoard to Canvas, the usage rate of BlackBoard was reported to be 56.43% in a recent month. Suppose that you decide to select a sample of 100 students at your university and you find that 60 use the BlackBoard platform. **(12 points)**

   (a) Use the critical value approach to determine whether there is evidence that the usage rate for the BlackBoard platform at your university is greater than the reported usage rate of 56.43%. (Use the 0.05 level of significance.)

   (b) Suppose that the sample is n = 500, and you find that 60% of the sample of students at your university (300 out of 500) use the BlackBoard platform. Use the p-value approach to try to determine whether there is evidence that the usage rate for the BlackBoard platform at your university is greater than the reported usage rate of 56.43%. (Use the 0.05 level of significance.) (Use the 0.05 level of significance.)

2) A local pizzeria wants to reduce the waiting time for customers to receive their pizza orders. Until now, the population mean waiting time to receive the pizza orders was observed to be at least 4 minutes. However, in an effort to reduce the mean waiting time, the pizzeria has experimented with a new baking system with enhanced technology. A sample of 81 customers was selected, and their mean waiting time to receive the pizza orders was found to be 3.25 minutes, with a sample standard deviation of 130 seconds. **(12 points)**

   (a) Using the critical value approach is there any evidence that the new baking system is successful to reduce the mean waiting time?

   (b) Determine the p-value and interpret its meaning.

Paste your working here:

3) An auditor for a government agency is assigned the task of evaluating reimbursement for office visits to physicians paid by Medicare. The audit was conducted on a sample of 72 of the reimbursements, with the following results: **(12 points)**

In 12 of the office visits, an incorrect amount of reimbursement was provided.
The mean amount of reimbursement was $93.70 with a standard deviation of $34.55.

(a) At the 0.05 level of significance, is there evidence that the population mean reimbursement was more than $100? (Use the critical value approach)
(b) At the 0.02 level of significance, is there evidence that the proportion of incorrect reimbursements in the population was below 0.10? (Use the p-value approach)

Paste your working here:

4) There is a dataset with nineteen observations on the yearly Gross Domestic Product (GDP) of a country. There are three predictor variables that affect the GDP of the country – Education Spend in $million, the Unemployment rate as %, Employee Compensation in $million. You can find this data in the Linear-Regression-Exam-Question-4.xlsx file. **(12 points)**

   (a) State the multiple regression equation.

   _____

   (b) Interpret the meaning of β_1, β_2, and β_3, in this problem.

   _____

   (c) What is the significance of β_0?

   _____

   (d) Predict the GDP when Education Spend is $13,260 million, the Unemployment rate is 8.13%, and Employee Compensation is $199,999 million.

   _____

   (e) How much percent of variation in the GDP is explained by the regression model?

   _____

   (f) Does the regression model overestimate or underestimate the GDP for the year 2015?

   _____

Paste your Excel output and working:

5) There is a dataset with some information for each of the ten states in the United States. We are interested in predicting the per-pupil student expenditures in a state. To do so, there are three predictor variables: average income of that state, the % of the population under 18, and the region in which the state falls. You can find this data in the Linear-Regression-Exam-Question-5.xlsx file.
(12 points)

(a) State the multiple regression equation.

_____

(b) Predict the per-pupil student expenditures for a state with an average income of 5889, %_under_18 of 31.8%, and is in the Northeast region.

_____

(c) Predict the per-pupil student expenditures for a state with an average income of 5132, %_under_18 of 33.4%, and is in the West region.

_____

(d) How much percent of variation in the per-pupil student expenditures is explained by the regression model?

_____

(e) Does the regression model overestimate or underestimate the per-pupil student expenditures for the state “Ohio”?

_____

Paste your Excel output and working: