Problem 1: Mark the following statements as true or false in the blank space provided. If the statement is false, explain why it is false.

(a) _____: If the null hypothesis is not rejected, there is strong evidence that the null hypothesis is true.

(b) _____: All other things equal, choosing a smaller significance level, α, will increase the probability of making a Type II error.

(c) _____: The core principle of hypothesis testing is to reject H_0 only when the observed sample is unlikely to have occurred when H_0 is true.

(d) _____: The power of a test, β, is the probability of failing to reject the null hypothesis.

(e) _____: As the number of observations in an experiment increases, the t–distribution 'looks' more like the normal distribution.

Problem 2: A faster loan processing time produces higher productivity and greater customer satisfaction. A financial services institution wants to determine if their mean loan processing time is less than a competitor's claim of 6 hours. A financial analyst randomly selects 7 loan applications and manually calculates the time between loan initiation and when the customer receives the institution's decision. From the sample data, the sample mean of the loan processing time was 5.079 hours with a sample standard deviation of 1.319 hours. Assuming that the loan processing times follow a normal distribution, complete the following parts. You must show all necessary calculations and provide explanation.

(a) Find a 95% confidence interval for the population mean loan processing time.

(b) Compute the test statistic and the p–value that can be used to determine if their mean time is less than a competitor's claim of 6 hours.

(c) State the decisions at significance levels $\alpha = 10\%, 5\%$, and 1%.