STAT 614 HOMEWORK 8 TWO SAMPLE T TEST FINDING TYPE1 ONE AND TYPE2 ERRORS

1) The following data represent the daily rental for a compact automobile charged by two car rental companies. Thrifty and Hertz, in 10 locations. Test whether Thrifty is less expensive than Hertz at the α = .01 level of significance.

**Note**: A normal qq plot and boxplots of the data indicate normality with no extreme outliers. Hence, we can proceed with the Two Sample T Test.

The data is provided below.

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| **City** | **Thrifty** | **Hertz** |
| Chicago | 21.81 | 18.99 |
| Los Angeles | 29.89 | 48.99 |
| Houston | 17.90 | 19.99 |
| Orlando | 27.98 | 35.99 |
| Boston | 24.61 | 25.60 |
| Seattle | 21.96 | 22.99 |
| Pittsburgh | 20.90 | 19.99 |
| Phoenix | 47.75 | 36.99 |
| New Orleans | 33.81 | 26.99 |
| Minneapolis | 33.49 | 20.99 |

a) State the null and alternative hypothesis

b) Use and show R code to find the t statistic, the p-value, and the 95% confidence interval. (Remember to test for equal population variances)

c) State the appropriate decision to reject or fail to reject the null hypothesis based on the p-value

2) A current employees behavior survey asked. “How many days in the past 15 days have you felt demotivated?” Software reported sample means of 5.9 for executives and 2.1 for nonexecutives, with a 95% confidence interval comparing them of (1.5, 3.2), a t statistic of 5.2 and a P value of 0.000. Interpret these results by:

a) First stating and explaining the appropriate null and alternative hypothesis.

b) Explaining what this particular confidence interval tells us regarding a decision to reject or failing to reject the null hypothesis

c) Explaining what this particular p-value tells us regarding a decision to reject or failing to reject the null hypothesis

3) Consider the following information and conditions for a test of significance:

Ho: µ ≤ 3

Ha: µ >3

µT = 4 α = .01, σ = 1.5, n = 25

a) What is the probability of committing a Type 1 error?

b) If n = 50 instead of 25, would the probability for a Type 2 error increase or decrease?

c) Use the step by step method in the notes to find the probability of a Type 2 error

d) Find the Power of your test and explain what the Power of the test means.