Lab 5 (80 pts.) - One Sample *T* Confidence Interval and Test
Objectives: Confidence interval and significance tests

A. (30 points) Number of Friends on Facebook (Data Set: facebookfriends.txt - Website) Facebook provides a variety of statistics on their Web site that detail the growth and popularity of the site. One such statistic is that the average user has 130 friends. Consider the following SRS of n = 30 Facebook users from a large university.

99	148	158	126	118	112	103	111	154	85
120	127	137	74	85	104	106	72	119	160
83	110	97	193	96	152	105	119	171	128

1. (5 pts) Do you think these data are Normally distributed? Use graphical methods to examine the distribution. Write a short summary of your findings.
2. (5 pts) Is it appropriate to use the *t* methods of this section to compute a 95% confidence interval for the mean number of Facebook users at this large university? Explain why or why not.
3. (5 pts) Find the mean, standard deviation, standard error, and margin of error for 95% confidence. From those values, compute the 95% CI for μ. The CI is NOT to be calculated from the software package though the values in the first sentence maybe calculated via software. If the numbers are obtained via a software, please include the appropriate output. If the numbers are calculated by hand, please show your work. Work is required for the calculation of the CI.
4. (5 pts) Report the 95% confidence interval for μ, the average number of friends for Facebook users at this large university. This answer is obtained from the software package so the output needs to be reported. Compare with your answer in part 4.
5. (5 pts) Interpret your 95% confidence interval for μ obtained in previous question.

B (50 points) Counts of Picks in a 1-lb bag (Data Set: pickcount.txt -Website) A guitar supply company must maintain strict oversight on the number of picks they package for sale to customers. Their current advertisement specifies between 900 and 1000 picks in every bag. An SRS of thirty-six 1-pound bags of picks were collected as part of a Six Sigma Quality Improvement effort within the company. The number of picks in each bag are shown in the following table.

924	925	967	909	959	937	970	936	952
919	965	921	913	886	956	962	916	945
957	912	961	950	923	935	969	916	952
917	977	940	924	957	920	986	895	923

1. (12 pts) Create a histogram, boxplot, and a Normal quantile plot of these counts.
2. (4 pts) Write a description of the distribution. Comment on the skewness and Normality of the data. Note if there are any outliers.
3. (5 pts) Based on your observations in parts 1 abd 2, is it appropriate to analyze these data using the *t* procedures? Briefly explain your response.
4. (3 pts) Find the mean, the standard deviation, and the standard error of the mean for this sample.
5. (5 pts) Find the 95% lower confidence bound for the mean number of picks in a 1-pound bag.

6. (8 pts) Do these data provide evidence that the average number of picks in a 1-pound bag is greater than 925? Carry out a test of significance using the four*-step procedure, with a significance level of 5%, state your hypotheses, the value of test statistic, the *P*-value, and your conclusions. Please provide the relevant output required for the steps and include all four* steps written out by hand.

7. (8 pts) Do these data provide evidence that the average number of picks in a 1-pound bag is greater than 935? Carry out a test of significance using the four-step procedure, with a significance level of 5%. Please see the directions for Part 6.

8. (5 pts) Compare your conclusions for parts (5), (6) and (7). Are they the same or different?