MTH 245, Quiz #8, Spring 2023 Name _____

Instructions: Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown. Answer all parts of each problem. Provide explanations as indicated. You may use Excel to complete any required statistical calculations or graphs. Submit any Excel work with assignment. Do not say "see Excel" for answers, but write or paste them into this document. Exact answers are preferred unless specifically asked to round.

1. What sample size is needed for a population with an estimated standard deviation of $s = 7.54$ cm, and the margin of error on a 95% confidence interval is no larger than $E = 2.6$ cm?

2. Explain the reason we use the Student T-Distribution when the sample size is small and/or the population standard deviation is not known? In your answer, be sure to explain how the T-distribution differs from the normal distribution.

3. Given the following properties, calculate the indicated confidence intervals.
   a. $\bar{x} = 54.2, s = 21.3, n = 6, c = 90\%$

   b. $\hat{p} = 0.65, n = 824, c = 99\%$

4. A polling company would like to determine the proportion of the population that considers themselves independents (rather than Democrats or Republicans) in their town.
   a. Previous polling results put the proportion of independents at 35%. Using that information, what sample size is required to update the results with 95% and a margin of error of 3.5%.

   b. If they assumed no previous information on the proportion, how large would the same have to be then?