**Statistics PROJECT**

Complete this task individually. Due October 16, 2018.

* 1. Formulate 2 **well-written** survey questions that can be answered by using a simple random sample. One question must be able to be answered in exactly 2 ways (yes/no, for/against, agree/disagree, etc. and you will report a proportion, etc.) and the other must be answered by some numerical measurement (test score, 1-10 rating scale, number of times… and you will report a mean, etc.) Ask questions that are *interesting* to you.

(YOU MUST SUBMIT QUESTIONS TO ME IN WRITING PRIOR TO COLLECTING DATA and questions are due by Tuesday, October 2, 2018.)

* 1. Describe your population and how you will ensure you collect a simple random sample. **Estimate** the shape of your population distribution and the population number (parameters) to insure the proper number in your survey.
  2. When determining the number in your sample for your **proportional** survey, make sure your margin of error is less than 13% using a 90% confidence interval.
  3. Collect your data and show the data.
  4. Calculate summary statistics for your data to include the following

MEAN SURVEY QUESTION

* 5 Number Summary
* Box and Whisker Plot
* Appropriate Histogram
* Sample Mean
* Sample Standard Deviation
* Standard Error of the Mean (Standard Deviation of the Sample Means)
* Margin of Error
* Confidence Interval (95% Confidence Level) for the Population Mean

PROPORTIONAL SURVEY QUESTION

* Sample proportion
* Standard Error
* Margin of Error
* Confidence Interval (90% Confidence Level)
  1. For the Mean Survey Question: Create your histogram with appropriate intervals. Are the conditions for the Central Limit Theorem met by the data in your survey? Explain the implications of your results.

For the mean survey question, pick two data points (1 above and 1 below the mean). What is the probability that if you were to randomly select one observation, it would be between these data points? Answer this question using your exact data. Then **assume** your data is normally distributed and answer the same question theoretically. Compare and contrast the results.

For the Proportional Survey question, assume that your sample proportion is the same as your population proportion. Suppose you conducted another sample of the same size, what is the calculated probability that exactly 20 “successes” will be chosen from your data?

* 1. Assume that your statistics in #5 match the actual parameters. **Suppose** you were to expand your sample. If you plan to construct a 99% confidence interval and you wanted your margin of error to be less than 2 units from the mean or proportion, how large would your sample need to be? Show your work. (Use your results from your data, and if 2 units is unreasonable, explain why and choose another value.)

**Present your work either on a poster board or in the form of a paper.**