Name: _____
MAT 222
Spring 2019
Excel Lab 2: Ch. 7.1 & 7.2

"For you are life, rarer than a quark and unpredictable beyond the dreams of Heisenberg; the clay in which the forces that shape all things leave their fingerprints most clearly."
                    −Dr. Manhattan, Watchmen

The U.S. Equal Employment Opportunity Commission posts data about sex-based harassment claims filed with EEOC on their website. The data in `Sexual Harassment Claims.xlsx` was created based on the data reported on this website. Use Excel to answer the following questions based on the created data.

Problem 1: Complete the following:

Number of Months Collected: _____

Average Monthly Filings: _____

Standard Deviation Monthly Filings: _____

Problem 2: Construct a 93% confidence interval for the average number of complaints filed. Fill in your data below.

Degrees of Freedom: _____

t^*:   _____

Lower Interval Value: _____

Upper Interval Value: _____

Problem 3: To determine whether the average monthly complaints has decreased since 2017, perform an appropriate hypothesis test using a significance level of 0.05. Be sure to state your null and alternative hypothesis, test statistic, p-value, and conclusion.

$$\begin{cases} H_0 : \mu = 1036 \\ H_a : \mu < 1036 \end{cases}$$

Problem 4: Discuss what statistical assumptions are required for the calculations above in Problems 2 & 3. What are the ways one could improve the validity of the computations above? Be sure to use statistical concepts from the course to support your answer.

The website https://www.baseball-reference.com/ compiles baseball related statistics. The site contains data on over 19,000 players, and contains data spanning over 100 years of baseball. The file MLB Batting Averages.xlsx contains the batting averages (BA) from several of the top players from the 1990s and the 2000s. Based on this data, use Excel to answer the following questions.

Problem 5: Complete the following:

Number 1990s Top Players: _____   Number 2000s Top Players: _____

1990s Top BA Average: _____   2000s Top BA Average: _____

1990s Top BA StDev: _____   2000s Top BA StDev: _____

Problem 6: Construct a 97% confidence interval for the difference between the 1990s top BA and the 2000s top BA. Fill in your data below.

Degrees of Freedom: _____

t^*: _____

Lower Interval Value: _____

Upper Interval Value: _____

Problem 7: To determine whether the BA of the top players has increased from the 1990s to the 2000s, perform an appropriate hypothesis test using $\alpha = 0.01$. Be sure to state your null and alternative hypothesis, test statistic, p-value, and conclusion.

Problem 8: Discuss what statistical assumptions are required for the calculations above in Problems 6 & 7. What are the ways one could improve the validity of the computations above? Be sure to use statistical concepts from the course to support your answer.