***E370, Spring 2016***

***Lab Activities week of 03/21/2016***

***Valued at 25 points***

Solve the following problems. Please write down the Excel commands and the numerical results to receive full credit. Please round your answers to 3 decimal places.

1. The store managers of *Walmart* would like to estimate the mean expenditure of a customer in their store. Answer the following questions.

1. Suppose that a sample of 64 customers indicates that the average expenditure is 50 dollars with a standard deviation of 25 dollars. Construct a 90% confident interval for the mean expenditure and interpret your result. (3 pts)
2. Now assume that the standard deviation of 25 dollars is the **population** standard deviation instead of sample standard deviation. Construct a 90% confident interval for the mean expenditure and interpret your result. (3 pts)
3. Compare your confidence intervals in parts (A) and (B). If they are different, what is the reason for that difference? (2 pts)
4. Using the same information as in part (B) to construct a **98%** confident interval for the mean expenditure and interpret your result. (2 pts)
5. Compare your confidence intervals in parts (B) and (D). If they are different, what is the reason for that difference? (2 pts)
6. Using the same information as in part (B), how many customers do they need to interview to construct a 96% confidence interval for the mean expenditure in *Walmart’s* that is **no wider than** 4 dollars? (2 pts)

2. *Facebook* surveyed a random group of 500 American users if they had friends from other countries on *Facebook* and 77% indicated that they had.

1. What is the distribution of this sample proportion? Justify your conclusion. (2 pts)
2. Estimate a 96% confidence interval for the true proportion of American users on *Facebook* who have friends from other countries. (2 pts)
3. Interpret the confidence interval. (1 pts)
4. Another survey of a random group of 500 American users indicated 90% of them have friends from other countries on *Facebook*. Estimate a 96% confidence interval for the true proportion based on this survey.(2 pts)
5. How does the width of confidence interval in (B) and (D) differ? Why? (2 pts)
6. How many American users would *Facebook* have to interview to get a 96% confidence interval **within 4%** of the population proportion if 77% were the preliminary estimate of the proportion? (2 pts)