***E370, Spring 2016***

***Lab Activities week of 03/07/2015***

***Valued at 25 points***

1. In the Monroe County Elementary School, 75% of pupils have access to the Internet at home. Using Excel, and reporting your command as well as the outcome, answer the following questions. **(8 points)**

* 1. Randomly select a pupil. What is the probability that he or she has access to the Internet at home? (1 point)
  2. Randomly select a sample of size 100, what is the proper distribution for the sample proportion? Why? (2 points)
  3. What is the probability that the sample proportion of pupils that have access to the Internet at home

(i) is equals to 55%? (1 points)

(ii) is between 60% and 80%? (2 points)

c. Randomly select a sample of size 150, between what two values symmetric around the population proportion will 80% of sample proportions be found? (2 points)

2. A radar unit is used to measure speeds of cars on a highway. The speeds are normally distributed with a mean of 60 mph and a standard deviation of 10 mph. **(12 points)**

1. A random sample of 36 cars is selected. What is the center, dispersion and shape of the distribution of the sample mean speed? (3 points)

1. A random sample of 36 cars is selected. Among the 10% fastest cars, what is the lowest speed? (2 points)
2. A random sample of 36 cars is selected. What is the probability that the sample mean speed is greater than 65 mph? (2 points)
3. Would you change your answer to part a if the population speed is not normally distributed? Why? (1 point)
4. A random sample of 49 cars is selected. What is the probability that the sample mean speed is greater than 65 mph? (2 points)
5. Compare the results you get from c and e, how does the sample size affect the probability that the sample mean speed is greater than 65 mph? (2 points)

3. A local church in Bloomington is planning to have Thanksgiving Dinner for the homeless. The average weight of turkeys in local grocery stores is known to be 28 pounds with a standard deviation of 8 pounds. **(5 points)**

1. If the church buys 49 turkeys for the dinner, what is the probability that the sample mean weight of the turkeys is between 25 pounds and 30.5 pounds? (2 points)
2. In general, a turkey is considered to be a “big bird” if its weight is above 30 pounds. If they randomly buy a turkey, what is the probability that it will be a “big bird”? (1 point)

1. Based on the result of part b, suppose the church buys 49 turkeys for the dinner, how likely is that the sample proportion of “big bird” is more than 20%?

(2 points)