CS-Statistics	**Central Limit Theorem and Confidence Intervals**
Tutorial 6	

1. An unknown distribution has a mean of 90 and a standard deviation of 15. Samples of size $n = 25$ are drawn randomly from the population.

   a) Find the probability that the sample mean is between 85 and 92.

   b) Find the value that is two standard deviations above the expected value of the sample mean.

2. An unknown distribution has a mean of 90 and a standard deviation of 15. A sample of size 80 is drawn randomly from the population.

   a) Find the probability that the sum of the 80 values (or the total of the 80 values is more than 7500.

   b) Find the sum that is 1.5 standard deviations above the mean of the sums.

3. In a recent study, the mean age of tablet users is 35 years. Suppose the standard deviation is ten years. The sample size is 39.

   a) What are the mean and standard deviation for the sum of the ages of tablet users? What is the distribution?

   b) Find the probability that the sum of the ages is between 1,400 and 1,500 years.

   c) Find the 90th percentile for the sum of the 39 ages.

4. Interval estimation in large samples. Unknown distribution. Suppose that an accounting firm does a study to determine the time needed to complete one person's tax forms. It randomly surveys 100 people. The sample mean is 23.6 hours. There is a known standard deviation of 7.0 hours.

   a) Construct a 90% confidence interval for the population mean time to complete the tax forms.

   b) If the firm wished to increase its level of confidence and keep the error bound the same by taking another survey, what changes should it make?

   c) If the firm did another survey, kept the error bound the same, and only surveyed 49 people, what would happen to the level of confidence? Why?

   d) Suppose that the firm decided that it needed to be at least 99% confident of the population mean length of time to within one hour. How would the number of people the firm surveys change? Why?

5. A random sample of statistics students were asked to estimate the total number of hours they spend looking at their mobiles during an average day. The responses are: 0, 3, 1, 20, 9, 5, 10, 1, 10, 4, 5, 14, 4, 5, 2. Use this sample data to construct a 98% confidence interval for the mean number of hours statistics students will spend on the mobiles.