Group Work #1

In groups of 2-3, answer the following questions.

1. A college physical education department asked a random sample of 200 female students to self-report their heights and weights, but the percentage of students with body mass indexes over 25 seemed suspiciously low. One possible explanation may be that the respondents “shaded” their weights down a bit. The CDC reports that the mean weight of 18-year-old women is 143.74 lb, with a standard deviation of 51.54 lb, but these 200 randomly selected women reported a mean weight of only 140 lb.

   a) Find the mean and standard deviation of the sampling distribution model of mean weights for a sample size of 200 female students.

   b) Why is the Normal model appropriate here?.

   c) Based on your model in part c, does the mean weight of 140 lb seem exceptionally low to you or could this just be random sample-to-sample Variation?

2. The Wechsler Adult Intelligence Scale (WAIS) is a common “IQ Test” for adults. The distribution of WAIS scores for persons over 16 years of age is approximately normal with a
   mean of 100 and a standard deviation of 15.
   a) What is the probability that the WAIS score for a randomly selected adult is 105 or higher?
   b) What is the mean and standard deviation of the sampling distribution of the average WAIS score for a random sample of 60 people?
   b) What is the probability that the average WAIS score for a sample of 60 people is 105 or higher?

Group Work #2

3. Mr. H.T. Wheels, President of the Getmethere Bus Company, claims that the busses in the company fleet average at least 22 miles per gallon. A competing company believes that Mr. Wheels has inflated this average. A random sample of 35 buses was selected and their fuel consumption records studied. The average mpg for the sample was 20 mpg, with a sample standard deviation of 2.3. Consider the accusation that Mr. Wheels has inflated his average.

4. The International Coffee Association has reported the mean daily coffee consumption for U.S. residents as 1.65 cups. A random sample of 38 people from a North Carolina city consumed a mean of 1.84 cups of coffee per day, with a standard deviation of 0.85 cups. Is this evidence that the residents of this city be said to be significantly different from their counterparts across the nation? Source: coffeeresearch.org, August 8, 2006.

Group Work #3

5. The owner of a small business complained that the rent was too high. He randomly surveyed 15 other businesses in his locality and found that the mean rent on their small stores was $1325 per month with a standard deviation of $45.

   a) Construct a 90% confidence interval to estimate the true average monthly rent for businesses in this area. (Show all 4 steps!)

6. Consumer Reports is conducting independent tests to determine the distance a car of a certain make and model will travel while consuming only 1 gallon of gas. Nine cars are randomly selected and an average of 28.2 miles is obtained. The standard deviation was 2.7 miles. From previous experiments, it is known that the repeated measurements follow Normal model. Find a 98% confidence interval for the mean distance for all cars of this type using 1 gallon of gas.