Handout Confidence Intervals and Hypothesis Tests

1. The average weight of 40 randomly selected minivans was 4150 pounds.
   a. Find and interpret a 98% confidence interval for the mean weight of all minivans.
      The standard deviation is known to be 480 pounds.
   b. What could we do to reduce the width of this interval?
   c. What are the advantages/disadvantages of your answers in b?

2. The weight of grapefruit follows a normal distribution. A random sample of 12 new hybrid grapefruit had a mean weight of 1.7 pounds with a standard deviation of 0.24 pounds. Find a 95% confidence interval for the mean weight of the population of new hybrid grapefruits. Interpret the CI in terms of the problem.

3. A researcher wishes to estimate, within $25, the true average amount of postage that parents of college students spend each year. If she wishes to be 90% confident, how large a sample is necessary? The standard deviation is known to be $80.

4. A sample of 17 states had these cigarette taxes (in cents): 112, 120, 98, 55, 71, 35, 99, 124, 64, 150, 150, 55, 100, 132, 35, 70, 93. Find a 98% confidence interval for the mean cigarette tax in all 50 states. What assumption is necessary?

5. A report in USA Today stated that the average age of commercial jets in the United States is 14 years. An executive of a large airline company selects a sample of 36 planes and finds a sample mean of 11.8 years with a sample standard deviation of 2.7 years. At $\alpha = 0.01$, can it be concluded that the average age of the planes in his company is less than the national average?

6. A job placement director claims that mean starting salary for nurses is $34,000. A random sample of 10 nurses’ salaries has a mean $33,450 and a standard deviation of $4000. Is there enough evidence to reject the director's claim at $\alpha = 0.05$? Explain your answer in terms of the problem.