1. Suppose a sample of n=50 elements is drawn from a population of manufactured products and the weight of each item is recorded. Prior experience has shown that weight has a probability distribution with μ=6.0 and σ=2.5 ounces.
a) Calculate the expected value and the variance of the average of the 50 elements.
b) What is the approximate probability that the manufacturer's sample has a mean weight of between 5.75 and 6.25 ounces?
c) What is the approximate probability that the manufacturer's sample has a mean weight of less than 5.5 ounces?

2. This past year, an elementary school began using a new method to teach archimetic to first graders. A standardized test, administered at the end of the year, was used to measure the effectiveness of the new method. The distribution of past scores on the standardized test produced a mean of 75 and a standard deviation of 10.
a) If the new method is no different from the old method, what is the approximate probability that the mean score of 36 student will be greater than 79?
b) What assumptions must be satisfied to make your answer valid?

3. Pulse rate is an important measure of the fitness of a person's cardiovascular system. The mean pulse rate for American adult males is approximately 72 heart beats per minute. A random sample of 21 American adult males who jog at least 15 miles per week had a mean pulse rate of 52.6 beats per minute and standard deviation of 3.22.
a) Find a 95% confidence interval for the mean pulse rate of all American adult males who jog at least 15 miles per week.
b) Interpret the interval found in part **a**.
c) What assumptions are required for the validity of the confidence interval?

4. To perform an experiment, a chemist has to use a substance that contains 50% sodium nitrate. The chemist suspects that a particular batch of substance has not been mixed thoroughly, thus causing the amount of sodium nitrate to vary from one proportion of the batch to another. The results of 11 randomly selected 10 g samples yield a sample standard deviation equal to 0.05 g and sample mean 50.02 g. In what range could be the variance of the amount of sodium nitrate in 10 g samples with 95% probability?

5. A marine biologist wishes to use male angelfish for experimental purposes due to the belief that their weight is fairly stable (i.e. the variability in weights among male angelfish is small). The biologist randomly samples 16 male angelfish and finds that their mean weight is 4.1 pounds and the standard deviation is 1.73 pounds. Find a 95% confidence interval for the variability in weights of all male angelfish.