Chapter 7 Homework
Show all work using methods discussed on the lecture notes. Correct answers without supporting work will receive no credit. Round answers to 4 decimal places. Draw graphs and include probability functions where appropriate.

1. Suppose that the distance of fly balls hit to the outfield (in baseball) is normally distributed with a mean of 250 feet and a standard deviation of 50 feet. We randomly sample 49 fly balls.
   a. In words, define the random variable \( \bar{X} \).
   b. Give the distribution of \( \bar{X} \).
   c. What is the probability that a random sample of 49 balls traveled an average of less than 240 feet?
   d. Find the 80\(^{th}\) percentile of the distribution of the average of 49 fly balls.

2. According to the Internal Revenue Service, the average length of time for an individual to complete (keep records for, learn, prepare, copy, assemble, and send) IRS Form 1040 is 10.53 hours (without any attached schedules). The distribution is unknown. Let us assume that the standard deviation is two hours. Suppose we randomly sample 36 taxpayers.
   a. In words, define the random variable \( X \).
   b. In words, define the random variable \( \bar{X} \).
   c. Give the distribution of \( \bar{X} \).
   d. Would it be unusual if the 36 taxpayers finished their Form 1040s in an average of more than 11.5 hours? Explain
   e. Would it be unusual if one taxpayer finished his or her Form 1040 in more than 11.5 hours? Explain

3. The percent of fat calories that a person in America consumes each day is normally distributed with a mean of about 36 and a standard deviation of about ten. Suppose that 16 individuals are randomly chosen.
   a. In words, define the random variable \( \bar{X} \).
   b. Give the distribution of \( \bar{X} \).
   c. For the group of 16, find the probability that the average percent of fat calories consumed is less than 30.
   d. Find the first quartile for the average percent of fat calories.

4. Sue is a personnel manager in a large corporation. Each month she must review a random sample of 16 of the employees. From past experience, she has found that the reviews take her approximately 4 hours each to do with a population standard deviation of 1.2 hours.
   a. In words, define the random variable \( X \).
   b. In words, define the random variable \( \bar{X} \).
   c. Give the distribution of \( \bar{X} \).
   d. Find the probability that one review will take Sue from 3.5 to 4.25 hours.
   e. Find the probability that the mean of a month's reviews will take Sue from 3.5 to 4.25 hrs.
   f. Find the 95\(^{th}\) percentile for the mean time to complete one month's reviews.