Quiz #5c: Chapter 7

1. The U. S. Bureau of Labor Statistics conducts periodic surveys to collect information on the labor market. According to an estimate by the bureau, workers in the private sector earned an average of $13.21 per hour in 1999. Assume that the hourly wages for all workers in the private sector in 1999 have a normal distribution with a mean of $13.21 and a standard deviation of $2. Find the proportion of these workers whose hourly wages were:

a. between $15 and $17 b. between $11 and $14 c. more than $16

2. A population of N=10000 has σ=25. In each of the following cases, which formula will you use to calculate the standard deviation of the sampling distribution for the sample mean and then use the appropriate formula to calculate it:

a. n = 2000 b. n = 300

3. Freddy is taking a basic statistics class at WCC. The class starts at 6 pm and he needs to be there on time to get a punctuality bonus point. Freddy leaves from home and at that time of day it takes him an average of 15 min to get to the classroom. However, due to the variability in traffic and parking conditions, the standard deviation of his srips is 3 min. Suppose the population of his time to reach the classroom has a normal distribution with a mean o 15 min and a standard deviation of 3 min.

a. What time should Freddy leave home for class so that he gets the bonus point 99% of the time?

b. If he leaves at 5:40 pm, what percentage of the time would he get the bonus point?

4. A machine that cuts and wraps cheese is supposed to produce packages that contain 10-oz of cheese. However, due to variability in the process, the actual amount of cheese varies slightly. The amount of cheese cut and packaged in this manner follows a normal distribution with a mean than can be set to any desired value. The standard deviation of the amount of cheese is always 0.1-oz, regardless of the mean amount. If the company wants to make sure than 99% of the packages contain at least 10-oz of cheese, to what value should the mean of the machine be set?

5. Suppose the incomes of all people in America who own hybrid (gas and electric) vehicles are distributed with a mean of $58,000 and a standard deviation of $8300. Let x-bar be the mean income of a random sample of 50 such owners. Determine the mean and standard deviation of the sampling distribution and describe its shape. Calculate the probability that the mean of such a sample would be greater than $60,000.

6. Brooklyn Corporation manufactures CDs. The machine that is used to make these CDs is know to produce 6% defective CDs. The quality control inspector selects a sample of 100 CDs randomly every day and inspects them for being good or defective. If 8% or more of the CDs in the sample are defective, the process is stopped and the machine is readjusted. What is the probability that based on a sample of 100 CDs the prcess will be stopped to readjust the machine, if the true defective percentage is 6%? What is the mean and standard deviation and shape of the sampling distribution for p-hat?

7. The distance from WCC to a student's home follows a right-skewed distribution with a mean of 15 miles and a standard deviation of 8 miles.

a. Find the probability that the mean distance from WCC to home for a random sample of 50 WCC students is more than 18 miles.

b. For this sample of 50 students, find the probability that their distance from WCC to home is between 14 and 17 miles.

c. What is the shape of the sampling distribution if a random sample of 10 students was selected instead of 50? Can you determine the mean and standard deviation of this new sampling distribution? If so, what are they? If not, why not?