Exam #3: Chapters 6 - 7　　　　　　　　　　　NAME _____
Math 160, Section 7963
Spring 2010: Michael Orr
100 points. Show all work to receive full credit. You may use a calculator. CHECK YOUR WORK!!!!
THERE ARE 4 PAGES IN THIS EXAM

Write down all formulas or calculator commands used to receive credit!!!!!!!!

1. (6 pts) Assume that the weight loss for the first month of a diet program varies between 6 pounds and 12 pounds and is spread evenly over the range of possibilities, so that there is a uniform distribution. Find the probability of more than 10 pounds lost.

2. (6 pts) Find the margin of error for the following: 96% confidence interval, $n = 91,\ \bar{x} = 53,\ s = 12.5$.

For Problems 3 & 4 estimate the indicated probability by using the normal distribution as an approximation to binomial distribution:

3. (8 pts) Estimate the probability of getting exactly 43 boys in 90 births.

4. (8 pts) A multiple choice exam consists of 60 questions. Each question has 4 possible answers of which one is correct. If all the answers are random guesses, estimate the probability getting at least 20% correct.

5. (16 pts total) The daily intakes of milk (in ounces) for ten randomly selected people were:
   17.0 12.1 18.6 16.2 17.8 24.3 26.7 10.3 27.0 30.3

   A. Find a 99% confidence interval for the population mean μ. Assume the population has a standard normal distribution.

   B. Find a 99% confidence interval for the population standard deviation σ.

6. (6 pts) Do one of the following as appropriate: a) Find the critical value $z_{\alpha/2}$, b) find the critical value $t_{\alpha/2}$, c) state neither the normal nor the t distribution apply (state why).
   95%, $n = 11$, σ is known; population appears to be very skewed.

7. (4 pts) Find the appropriate minimum sample size. You want to be 99% confident that the sample standard deviation s is within 5% of the population standard deviation.

8. (8 pts) In a survey of 4800 TV viewers, 50% said they watch network news programs. Find the margin of error for the 95% confidence interval used to estimate the population proportion.

9. (8 pts) Find the minimum sample size you should use to assure that your estimate of p, the population proportion, will be within a margin of error of 0.022 for a 93% confidence level where p and q are unknown.

10. (8 pts) A final exam in Math 160 has a mean of 74 with a standard deviation of 8.5. If 24 students are randomly selected, find the probability that their mean of their test scores is less than 70.

11. (8 pts) Two percent of hair dryers produced in a particular plant are defective. Estimate the probability that of 10,000 randomly selected hair dryers, between 225 and 230 are found defective. Use the normal approximation to the binomial distribution.

12. (6 pts) Use the given confidence interval (0.868, 0.890) to find the point estimate $\hat{p}$ and the margin of error E.

Point Estimate: _____   Margin of Error: _____

13. (8 pts) When 298 college students are randomly selected and surveyed, it is found that 111 own a car. Find a 99% confidence interval for the true proportion of all college students who own a car. (Round your answers to three decimal.)

 BONUS *(10 points)*

(5 pts) The systolic blood pressures of the patients at a hospital are normally distributed with a mean of 139 mm Hg and a standard deviation of 13.1 mm Hg. Find the two blood pressures having these properties: the mean is midway between the them and 90% of all blood pressure readings are between them.

(5 pts) How many ways can the letters in the word "INDEPENDENCE" be arranged?