4/15/2002 MA331 Applied Prob/Stats I Name:_____
Dr. Lunsford Quiz 10 (The Last Quiz!) (20 Points Total)

I. Suppose X_i, $i = 1,...,9$ is a random sample of soapboxes from a shipment of soapboxes whose weights are normally distributed with mean 6.05 pounds and variance 0.0004 pounds. Let $\overline{X}$ be the sample mean of this random sample. Please answer the following. (15 points total)

a. What is $E\left[\overline{X}\right]$? (2 points)

b. What is $Var\left[\overline{X}\right]$? (3 points)

c. Find $P\left(\overline{X} < 6.035\right)$. (5 points)

d. Find the probability that at most two of the nine boxes weigh less than 6.0171 pounds. (Hint: Let Y be the number of boxes that weigh less than 6.0171 pounds and note that $P(X_i < 6.0171) \approx 0.05$, for each $i = 1,...,16$) (6 points)

II. Students took $n = 64$ random samples of water from a local lake and measured the amount of sodium in parts per million (ppm) for each sample. For their data they calculated an average of $\overline{x} = 21.45$ ppm with a sample standard deviation of $s = 0.31$ ppm. Find a 90% confidence interval for m , the mean amount of sodium in the lake in ppm. (6 points)