MATH E-3 PRACTICE QUIZ #2 Questions

NOTE: on the actual exam, most of the questions will be multiple-choice, although you may have to type in some numerical answers.

Question 1. NOTE: you should print out your own z-tables from the reading. You will need to use them in order to answer some of these questions. Round percents to 1 decimal place, unless your answer is a whole percent such as 68% or 95% resulting from the "rough and ready rules."

Assume that the weights of American men are normally distributed, with a mean of 175 pounds, and a standard deviation of 16 pounds. If you randomly pick an American male, what is the probability that he is:

a) heavier than 191 pounds?

b) lighter than 175 pounds?

c) between 159 and 191 pounds?

d) heavier than 207 pounds?

e) between 143 and 191 pounds?

f) lighter than 150 pounds?

g) between 143 and 207 pounds?

h) between 159 and 175 pounds?

i) between 191 and 207 pounds?

j) between 175 and 195 pounds?

k) heavier than 200 pounds?

l) between 150 and 180 pounds?

Question 2.

The use of particle accelerators enables us to count individual molecules in microscopic samples of gas. Suppose a sample of 2600 air molecules is analyzed, and is found to contain 494 molecules of oxygen (O_2). Find a 95% confidence interval for the true <u>percentage</u> of oxygen in the atmosphere.

Extra credit: If you wanted your confidence interval to have a smaller margin of error, namely 1.2% (i.e. a standard deviation of 0.6%), what larger sample size would you need?

Question 3 (rather old question. . .). Only do parts a), b) and c).

The owners of the Seabrook nuclear power station, in attempt to speed up the process of full-power licensing for the station, produce figures claiming that 62% of residents in the town of Seabrook are in favor of the station operating at full power. You, however, being an anti-nuclear proponent, are suspicious of these figures, and decide to do some research of your own. You ask 25 Seabrook residents, and find that 12 of them are in favor of the station.

a) What can you conclude from this poll? Show all your calculations, and explain your reasoning carefully.

b) Why might the results of the poll in part **a)** be somewhat unreliable?

After passing the course MATH E-3, you take another poll: this time you ask 100 Seabrook residents, and find that 47 of them are in favor of the station.

c) After redoing your calculations, can you come to a different conclusion from that which you reached in part **a)** ? Explain.

[d) *The Seabrook question gets put onto the Massachusetts ballot, and 71% of Mass voters indicate that they are against the Seabrook station getting a full-power license. Explain the discrepancy between these figures and those in parts* ***a)*** *and* ***c)****.]*

Question 4.

A business researcher wonders whether men and women have equal chances of getting into management positions in local businesses. She studies a sample of 250 vacancies for management jobs, and finds that 140 of them get filled by men.

Set up a Null Hypothesis and conduct a hypothesis test for this situation. Remember to follow the steps as shown in class, including a conclusion that relates your results to the original situation.

Extra credit: Are there other factors that should be taken into consideration, other than those mentioned above? Explain.