Student Number:_____ **Quiz 4**
March 1, 2004 **Confidence Intervals and Sample Size (Ch 7)**

Ground rules:

- DO NOT WRITE YOUR NAME ON THE QUIZ. If you're worried about losing the first page, write your student number on each page.
- You can use your notes or books, but you may not communicate with other people about this exam nor the material covered by it. You may use a calculator.
- In order to receive as much credit as possible, please show all of your work. Showing that you understand the question and know how to set up the solution correctly is more important than arriving at the exact answer.
- Read each question carefully and answer all parts of each question. Make sure to interpret your answer for a non-technical audience.
- Good luck!

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1. A university dean is interested in determining the proportion of students who receive some sort of financial aid. Rather than examine the records for all students, the dean randomly selects 200 students and finds that 118 are receiving financial aid. Use a 90% confidence interval to estimate the true proportion of students on financial aid. Make sure to state your assumptions and to interpret your results in non-technical language for the dean. (10 points)

2. The dean would like to know what would cause the width of the range estimate to become more narrow. What 3 factors could change the width of the estimate? (10 points)

3. The dean would like to know if the sample of 200 students she selected is large enough to estimate the true proportion of all students to within plus or minus 3% with 99% reliability. If the sample is not large enough, tell the dean the sample size she would need (don't worry about correcting the size for without replacement sampling). Make sure to show how you arrived at your answer and interpret your result in nontechnical language for the dean. (10 points)

4. Reprise last quiz: Please state whether the following statements are **true** or **false**. If the statement is false, please write a correction below the statement.

4a. The Central Limit Theorem guarantees that the population that you are sampling from is approximately normal whenever you have selected a sufficiently large sample. (5 points)

4b. As the sample size taken gets larger, the standard error of the sampling distribution of the sample mean gets larger as well. (5 points)

4c. The standard error of the sampling distribution of the sample mean is equal to s, the standard deviation of the population. (5 points)

5. Extra Credit (OPTIONAL): Correct your estimate of the sample size the dean would need in question 3 for without replacement sampling. Explain why the sample size is different from the original sample size calculated. (5 points)