Write all answers in your blue book and show all work there. Return your exam and printout(s) in your blue book.

16 pts.
1) Mr. Data prides himself on the expedient collection of data and his firm, GarbageIn/GarbageOut always underbids the competition.
   a) You want an estimate of the proportion of consumers who will buy your product in Baltimore. Mr. Data proposes to send interviewers to a few randomly selected schools and shopping centers. What kind of sample would you call this? What is the primary advantage and disadvantage to this kind of sample?
   b) Mr. Data gives his interviewers no particular instructions pertaining to the selection of interviewees, other than to complete the interviews as fast as possible. Suggest a more scientific method of selecting the interviewees.
   c) Mr. D offers, as an alternative, to mail a large number of questionnaires to randomly selected residents. Is he likely to get a high response rate? Of what concern is this?

17 pts.
2) Suppose that we have the following population: \( X = \{4, 4.2, 4.4, 4.6, 4.8, 5, 5.2, 5.4, 5.6, 5.8, 6\} \).
   a) Could \( \sigma \) be 2.5? Why, (don’t calculate, think!)?
   b) Could the sampling distribution for \( \bar{X} \) include 7? Why?
   c) Could the sampling distribution for \( \bar{X} \) include 6? Why?
   d) Could \( \sigma_{\bar{X}} \) be 2.5? Why?
   e) Does the EV(\( \bar{X} \)) = 6? Why?

17 pts.
3) a) Ms. X requires that confidence intervals for mean revenue be no more than $5000 wide and that they be 95 percent reliable. If \( \sigma \) is thought to be $6000, what sample size is required?
   b) If such a sample is drawn and \( \bar{X} \) is $90,000 and \( s = 7000 \), find a 95 percent confidence interval for mean revenue.
4) COMPUTER PROBLEM
   a) Open “BLS” in the chapter 9 Excel files with either SPSS or Excel
   b) Find a 99 percent confidence interval for the population mean of age.
   c) Print your results (with your name) and be sure that the confidence interval is clearly identified on the printout.

5) President C. thinks that the proportion of the alumni opposed to a recent policy initiative is about 15 percent. A recent sample of 100 has 25 who are opposed.
   a) Test the hypothesis at the one percent level of significance. (Show all steps to the test.)
   b) If the real proportion is 20 percent, what is the probability that the president’s hypothesis will be accepted.

6) The Clean Corp cleans equipment if it has convincing evidence that less than 97 percent of its output is clean. If it draws a sample of 100 units and finds 95 that are clean, what action should it take? Let \( \alpha \) be .05. (Show all steps to the test.)

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has.