Assignment #6
Due Date: 03/06/03
at 11:50am (section 501)
 at 1:30pm (section 503)

Remember:
No assignment will be graded if it is not stapled and written in pen. Write your section number on the first page, under your name; otherwise, you will be penalized by 5 points. In order to receive the maximum number of points you must show how you obtained the results for each individual problem. There is no excuse for late assignments: a late assignment is an assignment submitted 10 minutes after the beginning of the course. For the SAS problem, you must submit a printout of the SAS code and a printout of the output, in addition to the floppy disk containing the SAS code and the output file. The floppy should have a label containing your name and section number. No floppy will be accepted without being labeled.

Problem 1 (15 points):

In 2000, as reported by ACT Research Service, the mean ACT Math Score was \( \mu = 20.7 \). Mrs. Teresa Gibson wants to estimate the mean ACT Math score of students in High School District 204. She obtains a sample of 20 students who took the ACT in 2000, looks up their ACT Math scores, and obtains the results shown below:

\[
\begin{array}{ccccccc}
24 & 23 & 16 & 26 & 25 \\
22 & 18 & 25 & 26 & 17 \\
28 & 27 & 23 & 21 & 23 \\
20 & 25 & 21 & 19 & 30 \\
\end{array}
\]

Assume that \( \sigma = 5 \).
(a) Use the above data to compute an estimate for the population mean ACT Math score in High School District 204.
(b) Because the sample size is small (smaller than 30), we must verify that ACT scores are normally distributed. Verify that the distribution is normal. Are the conditions for constructing confidence intervals satisfied?
(c) Construct a 90% confidence interval for the ACT Math score for all students in District 204 who took the exam.
(d) Do Mrs. Gibson’s students appear to have a mean ACT Math score different from that of the general population? Why?
Problem 2 (5 points):

A Gallup poll conducted December 20-21, 1999 asked Americans how many hours of TV they watch during the week. How many subjects would be needed in order to estimate the number of hours of TV Americans watched in 1999 during the week within 0.5 hours with 95% confidence? Initial survey results indicate $\sigma = 1.8$.

Problem 3 (5 points):

The Gallup Organization conducted a poll of 2350 likely voters just prior to 2000 presidential election. The results of the survey indicated that George W. Bush would receive 48% of the popular vote and Al Gore would receive 46% of the popular vote. The margin of error was reported to be 2%. The Gallup Organization reported that the race was too close to call. Use the concept of confidence interval to explain what this means.

Problem 4 (15 points):

In a Harris Poll conducted February 9, 2000, 1247 out of 2208 randomly selected Americans said they judged that the state laws governing child safety restraint in vehicles should be strengthened.

(a) Verify that the requirements for constructing a confidence interval about $p$ are satisfied.

(b) Construct a 90% confidence interval for the proportion of Americans who judge that state laws governing child safety restraint in vehicles should be strengthened. Interpret this interval.

(c) Construct a 95% confidence interval for the proportion of Americans who judge that state laws governing child safety restraint in vehicles should be strengthened. Interpret this interval.

(d) What is the effect of increasing the level of confidence on the width of the interval?

Problem 5 (10 points):

Use SAS to solve problem 6.13 (in your textbook, page 432)