Stat 3011 Final Exam (Computer Part) **Dec. 21, 2000**

The exam is open book, open web pages. You may use the computer, a calculator, or pencil and paper to get answers, but it is expected that you will use the computer. **Show all your work!**

- For simple computer commands, you may write the **command** you used and the **result** it gave on this test form.
- For complicated commands or plots, make a printout and **attach the printout** to the test form (we'll provide a stapler).

No credit for numbers with no indication of where they came from!

The points for the questions total to 100.

An on-line version of the test is at the URL

`http://leech.stat.umn.edu/geyer/fi`

1. [15 pts.] Suppose heights of American adult women are normally distributed with mean 63.5 inches and standard deviation 2.5 inches.

   (a) Find the probability that a women randomly chosen from this population is taller than 67 inches.

   (b) Find the probability that a women randomly chosen from this population is between 60 and 65 inches tall.

   (c) Find the 80th percentile of this height distribution.

2. [25 pts.] The file

   `http://leech.stat.umn.edu/geyer/fi/munch.dat`

   contains two variables named `open` and `closed` consisting of measurements of loudness in decibels of noise made by chewing potato chips with mouth open and mouth closed (a study like this was actually done, the data here are simulated to have the same means and standard deviations). There were 10 subjects in each group (different subjects in the two groups, so 20 subjects in all). We want to do a test of significance about the difference (if any) between the two groups.

(a) Should we do a one-tailed or a two-tailed test? Explain. If you chose one-tailed, make clear which tail.

(b) Write out the null and alternative hypotheses that go with the procedure you chose in part (a).

(c) Do the test, computing the P-value.

(d) Interpret the P-value in terms of munching potato chips. What is the conclusion?

3. [25 pts.] Before a 1977 supreme court decision, doctors, lawyers, and other professionals were forbidden to advertise in most states. A study about acceptability of advertising by dentists was done soon after. It asked both consumers and dentists to respond to the statement "I favor the use of advertising by dentists to attract new patients." The possible responses were the column labels in the table below.

Group	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Consumers	34	49	9	4	5
Dentists	9	18	23	28	46

The total numbers of consumers and dentists in the study were fixed by the researchers. Only the responses ("Strongly Agree", etc.) are random.

We want to do a test about whether any difference in attitudes of dentists and consumers is revealed by this study.

(a) Describe the test that should be done to address this question.

(b) Describe the null and alternative hypotheses that go with the procedure you chose in part (a).

(c) Do the test, computing the P-value.

(d) Interpret the P-value in terms of attitudes of dentists and consumers. What is the conclusion?

4. [25 pts.] The file

`http://leech.stat.umn.edu/geyer/fi/scores.dat`

contains two variables named `SAT` and `GPA` consisting of math SAT scores and first-year GPAs for 100 students.

(a) Make a scatter plot of the data, plotting SAT on the x-axis. Add the regression line of GPA on SAT.

(b) Is there a statistically significant linear relationship between these two variables? Explain.

(c) Give a 95% prediction interval for the first-year GPA of an individual randomly chosen from the same population having a math SAT score of 650.