MATH 210 - Sample Final Exam Problems for Chapters 8 and 2
(revised 5/14/01)

1. See Problem #3ab on Test #3 - 4/23/98

2. See Part B on Test #3 - 11/14/97

3. In July 1996 a national poll was taken of 1003 registered voters. 391 favored Bob Dole for the Presidency (over Bill Clinton). A similar poll of 1003 register voters was taken in August with only 351 favoring Dole. Do these results provide evidence (at the .05 level) that the percentage support for Dole among all registered voters decreased from July to August?

4. A new variety of apple is intended to reduce the incidence of cedar apple rust. A horticulturist grows 100 trees of the new variety and 200 of the existing variety under the same environmental conditions. At the end of three years, each tree was checked by a researcher and classified as infected by rust or not infected. The results were that 45 trees of the new variety were infected and 123 of the existing variety were infected. Construct a 95% confidence interval for reduction in rust infection using the new variety.

5. Suppose the proportion of Manchester, full-time students in each class is as follows:

FY	SO	JR	SR
.351	.253	.189	.207

Student Activities Council sponsors a dance and a total of the 120 M.C. students attend, divided in the following classes.

FY	SO	JR	SR
50	35	20	15

Consider those in attendance as a random sample of people who attend dances at Manchester. Does the data provide evidence that the proportion in each class who attend dances differs from the overall proportion of students in each class? (Conduct a "multinomial test" using a=.05.)

6. A sample of 7th graders at a rural mid-western junior high were asked to rate their physical appearance and their popularity on a scale of 1 to 15 where a high number corresponds to better appearance and greater popularity. A scatter plot of the data and associated SPSS output is attached. *(This output is on reserve in the library and on the course web page!)*

   a. Describe the relationship observed in the scatterplot as completely as possible.

   b. Does the residual plot confirm the observations you made in (a). Explain why or why not?

   c. We wish to estimate a seventh-grader's assessment of their popularity (POP) using their self-rating of physical appearance (PHYS). Let us assume the LSR line adequately approximates the observed data. Fill in the equation of the line:

      POP = _____ + _____ PHYS

   d. Use the equation in (c) to estimate a student's popularity whose physical appearance rating is 10. **Show specific calculations.**

   e. Interpret the regression slope in the context of this study. (i.e., what does the slope tell us about how one's popularity increases or decreases with physical appearance?)

   f. Does this data provide convincing evidence (at the .05 level) to conclude a relationship truly exists between physical appearance and popularity in the broader population of 7th graders? **Explain your answer citing the appropriate P-value.**

   g. What percent of the variation in popularity is explained by the variation in physical appearance? **Explain.**

   h. Use the final scatterplot to construct a *prediction interval* for the popularity of a student with physical appearance of 10. **Interpret the meaning of this interval in the <u>context of the study</u>.**

   i. Use the final scatterplot to construct a *confidence interval* for the popularity of students with physical appearance of 10. **Interpret the meaning of this interval in the <u>context of the study</u>.**

   j. What plot should be checked to justify the validity of the intervals constructed in (h) and (i)? Does this plot support the use of these intervals? **Explain.**