MATH 210 - Test #3 - 11/14/00

For hypothesis tests clearly state H_0 and H_A , your test statistic (z or t) and your P-value. Points in [brackets] total 100.

1.   You wish to estimate the mean amount of time that first-year students spend studying for their classes each week. You choose a simple random sample (SRS) of 16 first-years, collect your data and compute a sample mean of 27 hours. Construct a 99% confidence interval for the mean for all first-year students, assuming that the standard deviation *for all such students* is 5 hours.

[15]

2.   Faculty generally recommend that students study 2 hours for each hour in class. A typical load is 15 credit hours suggesting students should study an average of 30 hours per week. Using the data from Problem #1, conduct a hypothesis test to determine if there is evidence (at the .05 level) that first-year students study less than suggested by faculty. **Now assume that the standard deviation of 5 hours was actually *computed from the sample.***

[15]

3.   After collecting your data, and before doing the analysis in #1, it would be advisable to make a graphical check (e.g., stemplot, boxplot or quantile plot). What two thing should you be checking for? **Explain why these checks are important!**

[5]

4. You wish to determine if the amount of time per week spent watching TV is the same for male and female M.C. students. You ask random samples of men and women how much they watch per week. The results are:

		n	$\bar{0}$	s
1)	Women	32	15	3
2)	Men	28	18	4

Conduct the appropriate hypothesis test to determine if the mean television time is the same for men and women or if it is different (use a=.05).

[15]

5. You choose an SRS of 700 adults in Indiana and ask them the question, "Do favor keeping or eliminating the Electoral College?" 400 respond they favor keeping the Electoral College. Construct a 95% confidence interval for the percentage of adults in Indiana who want to keep the Electoral College.

[15]

6. Suppose you wished to re-do your estimate for Problem #5, having a margin of error of only 2%, still with 95% confidence. How many people must be surveyed?

[10]

7.   Describe how you would set up a *matched pairs* experiment to determine if listening to company's sales presentation improves potential customers' opinion of the product being marketed. Include the following components:

[15]

      a.   How participants are selected
      b.   What the participants are required to do
      c.   What data is collected from the participants
      d.   What is done with the data collected

8.   A Type I error occurs when you conclude the _____ hypothesis, even though the _____ hypothesis is actually true.

[3]

9.   The probability of concluding the alternative hypothesis when it is actually true is called the: (circle *one*)

[3]

      a.   significance level
      b.   confidence level
      c.   power of the test
      d.   test statistic

10.   A Student's t distribution is a modified _____ distribution, used to model sample means when the _____ _____ of the population is unknown. A t-distribution has _____ area in the tails of the curve; this is represented by the fact that when constructing confidence intervals, the margin of error tends to be _____ when using t* instead of z*.

[4]