MATH 227 – SPRING 2004 **Name:**

Practice for Exam III (April 2004)

While it might seem like we have covered a lot of material since the second midterm, upon review we see that midterm III will cover mostly Chapter 9 - Estimation, and Chapter 10 - Hypothesis testing. Together, these constitute the area of statistics known as Statistical Inference. Depending on how far we get during Monday's class, the exam will cover a section or so of chapter 11.

Here are some things you should know for the exam:

1. Give a confidence interval for μ using a large sample, and understand what this means.

2. Give a confidence interval for μ when σ is unknown. Understand why we are forced to use Student's t distribution in this case rather than a normal distribution. Be able to explain the Student's t table of values.

3. Estimate p in the binomial distribution. Know when this estimation method is valid (i.e. When $np > 5$ and $nq > 5$)

4. Be able to choose a sample size based on a desired confidence level and interval width. Understand what you are doing here.

5. Understand the meaning of a null hypothesis, alternate hypothesis, rejection of a hypothesis, failure to reject a hypothesis, type I error, type II error, level of significance of a test, power of a test, critical region, the P value, and statistical significance

6. Test a hypothesis involving the mean μ for either large or small samples, including the following steps:

a) Decide on the null and alternate hypotheses

b) Decide on the sampling distribution (Normal for large samples, and Student's t for small samples.)

c) Sketch the critical region.

d) Compute the z value corresponding to the sample statistic $\overline{x}$

e) Compute the P value and compare it to the level of significance (You should be able to sketch the region associated to the P value on a sketch similar to that in part c).

f) Decide whether or not the data is statistically significant (statistically significant = reject the null hypotheis)

7. Conduct a similar test for a proportion p in the binomial distribution. Know when this sort of test is valid.

8. Be able to conduct a test for both the difference of two means, and for paired data.

9. Be able to conduct a test for independence using the chi-squared distribution.