Math 3070 - Final Exam Coverage - Fall 2003

**Formula Sheet:** You will be allowed one 8.5 × 11” sheet of paper on which you may write anything you please. I will not provide any formulas within the test so study carefully (i.e. calculating a binomial probability is not out of the question!). I will provide statistical tables for the standard normal and t-distribution. Don’t forget your calculator!

**Previous material:** About 25% of the test will be from old material. If you review your homework, your summaries and notes from the Midterm Coverage sheet, and midterm, you should do very well.

**Chapter 4: Probability and Probability Distributions:**

1. Assuming that you already have an understanding of the normal distribution and how to use Table 1 in the Appendix. This is extremely important. You will do poorly if you do not understand Table 1 as it is needed for questions based on the Central Limit Theorem (i.e. confidence intervals and hypothesis testing).

2. Starting with Sampling Distributions (section 4.12) understand what a sampling distribution actually is and what the Central Limit Theorem is about. Know the difference between the standard deviation and the standard error of \( \bar{y} \).

3. In section 4.13 we used the normal distribution to approximate probabilities for the binomial distribution. Be able to recognize when one may need to use this approximation and how to carry-out the calculations. Understand why we need to use continuity correction and how to use it in the calculation.

**Chapter 5: Inferences about Population Central Values**

1. Know the difference between a point estimate and an interval estimate for \( \mu \).

2. Know how to calculate a \((1 - \alpha)100\%\) confidence interval for \( \mu \) given any value of \( \alpha \). Note: This implies that you know when to use a percentile for construction using a standard normal distribution Vs. a t-distribution.

3. In general, know what role is played by the confidence coefficient and the sample size in the width of confidence intervals.

4. Be able to interpret a confidence interval *in terms of the problem.*

5. Be able to calculate a sample size to construct a confidence interval given a desired confidence coefficient, tolerable error \( W \), and the standard deviation (or estimate thereof).

6. Know the steps of hypothesis testing. Be able to read a problem and set-up the appropriate hypotheses, determine the critical value(s), make a decision, and draw a conclusion *in terms of the problem.*

7. Know what a p-value represents.

8. Understand Type I error, what symbol is used to represent this error, and how to make a decision using a p-value.

9. Be able to recognize whether you need to use a z-test or a t-test in performing a hypothesis test.

**Chapter 6: Inferences Comparing Two Population Central Values**

1. Obviously, you need to be able to recognize whether a question is asking you to make inference about one or two population means. If the question is asking you about only one population mean then you are being asked material about Chapter 5, otherwise you are in Chapter 6.

2. We only discussed the situation where one has two independent samples. For this situation (all of 6.2 essentially) we
- Calculated confidence intervals and performed hypothesis testing under the assumption that $\sigma_1^2 = \sigma_2^2$. Understand the difference between a point estimate and an interval estimate for the difference between two population means. Be able to calculate the pooled estimate of the standard deviation (denoted $S_p$ in the text and notes) from your formula sheet!

- Calculated confidence intervals and performed hypothesis testing under the assumption that $\sigma_1^2 \neq \sigma_2^2$. You should know how to calculate the necessary quantities to determine the degrees of freedom from your formula sheet!

3. In general, know how to perform hypothesis testing and interpret results for two independent samples.

4. Using the memory feature of your calculator should be very helpful. Know how to use this feature before the test and it could save you some time.