## MAT212 Test 2 (Spring 2003): sections 9.1-9.3, 10.1-10.4, 11.1-3

## Name:

## INSTRUCTIONS

- 1. ALL ANSWERS to be graded MUST BE ON THIS TEST.
- 2. Show ALL WORK to receive ANY CREDIT.
- 3. A normal table is attached to your test.
- 4. Points for each problem are in parentheses.

**Problem 1** (15 pts) Suppose that the heights of NKU women students are normally distributed with a mean of 64 inches and a standard deviation of 2 inches.

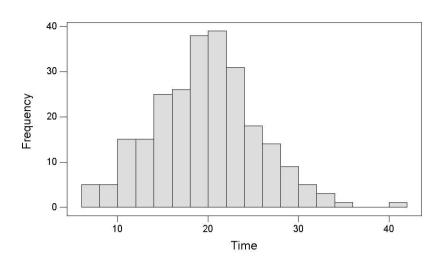
1. (5 pts) What is the probability that a randomly selected NKU woman student is taller than 62 inches?

2. (5 pts) A random sample of 10 women is selected. What is the probability that the sample mean height is greater than 62 inches?

3. (5 pts) What is the probability that the mean height of a random sample of 100 women is less than 66 inches?

**Problem 2** (30 pts) A survey of 250 Japanese middle managers was taken to discover how much time (in hours) they spent in leisure activites per week. Results from Minitab are below:

## Histogram of Time



Descriptive Statistics: Time

Variable	N	Mean	${ t Median}$	${\tt TrMean}$	${ t StDev}$	SE Mean
Time	250	19.280	19.000	19.201	5.776	0.365
Variable	${\tt Minimum}$	Maximum	Q1	QЗ		
Time	6 000	40 000	15 000	23 000		

1. (10 pts) Assuming that the population standard deviation is 6 hours, estimate with 90% confidence the mean leisure time per week for all Japanese middle managers.

2. (5 pts) Interpret your results.

3. (10 pts) Still assuming that the standard deviation is 6 hours, determine the sample size necessary to estimate the mean leisure time to within one hour.
4. (5 pts) How could you (or did you!) use the histogram in your analysis?
<b>Problem 3</b> (15 pts) A summer camp director claims that $50\%$ of his charges indicate on their camp evaluations that they had a great time at camp.
1. (9 pts) Assuming that this claim is true, what is the probability that in a random sample of $500$ campers, fewer than $45\%$ say they've had a great time?
2. (6 pts) Suppose that in a random sample of 500 campers, 225 indicate that they had a great time? What does this tell you about the director's claim?

monitor the air in the school. As a parent preparing to enroll your child, you are concerned that the air may not be safe for your child's health.
1. (6 pts) If you were to conduct a test, how would you set up the null and alternative hypotheses Explain.
2. (6 pts) Describe type I and type II errors given your hypotheses. What are the consequence of making these errors?
3. (3 pts) Discuss the relative values you would want $\alpha$ and $\beta$ to have considering the consequences of the errors.
<ul><li>Problem 6 (10 pts) For the following five terms, provide a short definition.</li><li>1. p-value</li></ul>
2. null and alternative hypotheses

Problem 4 (15 pts) A school near a nerve-gas disposal facility has been mandated to regularly

3. unbiased estimator
4. interval estimator
5. consistent estimator
<b>Problem 5</b> (15 pts) A random sample of 12 students in a business statistics course was drawn At the course's completion each student was asked how many hours s/he spent doing homework in statistics. The data are given as follows:
$31,\ 40,\ 26,\ 30,\ 36,\ 38,\ 29,\ 40,\ 38,\ 30,\ 35,\ 38$
It is known (who knows how!) that the population standard deviation is $\sigma = 8$ . The instructor has recommended that the students devote 3 hours per week for the 12-week course.
1. (10 pts) Test to determine whether there is evidence that the average student spent less than the recommended amount of time at a $5\%$ significance level. In particular, compute the $p$ -value of the test.
2. (5 pts) Comment on the validity of the test procedure.