MATH 210 - Test #1 - 10/3/02

Show all work for full credit! Points in [brackets] sum to 100.

Part A - Descriptive Statistics [27]

1. Construct back-to-back stemplots of the following data. (Do *not* truncate or split stems!) [5]

MEN:	35	51	53	61	62	74	76	84	88	89	93	97
WOMEN:	62	73	75	80	83	85	97	98	109	158		

2. Based on your stemplots, describe any significant differences in the men's and women's distributions. (Include the ideas of symmetry, variation and center.) [5]

3. Compute the mean of the women's data. [3]

4. For the women's data, the "sum of the squared differences" is $\Sigma(x-\bar{x})^2 = 6530$. Use this to calculate the *variance* and *standard deviation*. [4]

5. Determine the 5-number summary of the women's data.
[5]

L= Q_1= M= Q_3= H=

6. Use the appropriate *numerical* test to determine if there are any outliers in the women's data.
[5]

Part B - Normal Distributions [28]

Test scores on the math SAT are normally distributed with a mean of 500 and a standard deviation of 100.

1. Give a range that contains the middle 68% of SAT math scores.
[7]

2. What percent of scores are *greater* than 620?
[7]

3. What percent of scores are *between* 380 and 620?
[7]

4. Determine the 40^{th} percentile for SAT math scores.
[7]

Part C - Sampling Methods [20]

You are interested in how Manchester College students feel about the quality of Monday morning convos. You decide to stand in the lobby after convo next week and ask as many students as you can the question, "Do you feel convo is worth attending?"

1. Identify the following groups of people for *this particular survey*.
[12]

   a. the population

   b. the sampling frame

   c. the sample

2. Identify at least two sources of bias *(and up to two more for extra credit*) that are present in this sampling method. For each source of bias explain the type of bias, why the bias is present in this study, and in what direction the bias will occur (i.e., will the bias cause the survey to over-estimate or under-estimate the student body's view on the quality of convos).
[8]

   a.

   b.

Part D - Miscellaneous [25]

1. In a normal distribution, a z-score represents the number of _____ _____ that a given data value is from the _____ .

[3]

2. The median is called a _____ measure of center since its value is not greatly affected by _____ , _____ or _____ .

[4]

3. Suppose you construct a normal quantile plot and observe that the points fall in a concave up pattern (i.e., a big, upward sweeping curve). What does this tell you about your data?

[3]

4. Which of the following four measures of variation have the same units as the original data? (Circle *all* in the list that are correct.)

[5]

range interquartile range variance standard deviation

5. Using either paragraph or outline form, describe in detail how you would set up a randomized-comparative experiment to determine whether vitamin C reduces the incidence of colds in adults in the U.S. **Include in your description an explanation of why *randomization* and a *control group* are used.**

[10]