MATH 210 - Test #1 - 6/20/00

***Show all work for full credit*! Points in [brackets] total 100.**

Part A - Descriptive Statistics [30 points, 5 each]

You choose 18 M.C. students at random and ask them their parents annual household income. The resulting data (in $1000s) is :

26 28 30 33 33 34 34 34 34 35 36 37 38 40 45 50 60 100

1. Construct a *stemplot* of this data.

2. Describe the *overall pattern* of this data and any *exception*s to this pattern.

3. Compute the *five-number summary*. **(Indicate the computations done to determine these values.)**

   Min Q_1 M Q_3 Max

4. Should the mean or the median be greater for this data? **Give *two* reasons to support your answer.**

5. Use the "IQR Test" to determine if any of the income data should be considered an outlier.

6. Make a *modified* boxplot of this data and *explain* how the shape of the plot corresponds to your answer to #2. (Use the back of this sheet.)

Part B - Normal Distributions [25 points, 5 each]

Suppose that men's heights are normally distributed with a mean of 68 inches and a standard deviation of 2.6 inches.

1. What percent of men's heights are *below* 67 inches?

2. What percent of men's heights are *between* 64 and 67 inches?

3. State a range that contains 95% of men's heights.

4. Determine the 85^{th} percentile for men's heights.

5. Suppose that *women's heights* are normally distributed with a mean of 64 inches and a standard deviation of 2.3 inches. Who would you consider to be *shorter* — a woman who is 61 inches tall or a man who is 65 inches tall? ***Justify your answer with specific calculations!***

Part C - Sampling [21 points]

You wish to estimate the percent of M.C. alumni who believe varsity sports is an important part of the college experience. To obtain a large number of responses you plan to stand outside the football stadium prior to the homecoming football game and ask alums,

> *"Do you think that the participating in varsity sports is an important part of the college experience?"*

1. Identify the following components of this survey:
[9]

   a. The population

   b. The sampling frame

   c. The sample

2. There are several biases present in this survey method. Pick any three of the following categories and *explain in detail* how this bias is present in the study. (For up to 4 points extra credit identify two additional sources of bias that are present in this study.)
[12]

   a. Unrepresentative sampling frame
   b. Voluntary response
   c. Non-response
   d. Response bias
   e. Leading question

Part D - Miscellaneous [24 points]

1. Your baseball coach describes your hitting ability as "three standard deviations *below* the mean." Is this a complement or an insult? **Explain!**

[4]

2. You have the following twelve people who have agreed to participate in an experiment.

[6]

Bob	Crosby	John	Hamilton
Carol	Stills	Paul	Joe
Ted	Nash	Ringo	Frank
Alice	Young	George	Reynolds

You wish to choose six of them at random to receive a new medical treatment. Show in detail how you would use Table B to select the six people to receive treatment. **Be sure to indicate who is actually chosen and how you selected them!**

3. Which would be the best measures to use in describing the data from Part A — the mean and standard deviation or the median and IQR? **Explain!**

[4]

4. The variance for a particular set of data is 10. What is the standard deviation?

[4]

5. Describe several ways you might try to address the presence of the outlier(s) in Part A.

[6]