MATH 210 - Test #1 - 2/22/01

_____

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

Part A - Descriptive Statistics [25 point, 5 each]

Consider the following set of data: 12 15 20 23 26 34 37 40 52 75

1. Construct a *stemplot* of this data.

2. Give the *5-number summary* for these data.

3. Using the *IQR test*, determine if any of the data values should be considered an outlier.

4. Construct a *modified boxplot* for these data.

5. For these data, will the mean be greater than or less than the median? **Base your answer on your *stemplot* and *give two reasons* to support your conclusion.**

Part B - Normal Distributions [30 points, 6 each]

Suppose the time for employees at your company to travel to work is *normally distributed* with a mean of 32 minutes and standard deviation of 5 minutes.

1. Give a range containing the travel time for the *middle 95%* of your employees.

2. What percent of your employees require *less than 25* minutes to get to work?

3. What percent require *between 25 and 45* minutes?

4. Determine the 99^{th} *percentile* for travel times.

5. Joe has a very short travel time of 10 minutes while Martha has a very long time of 50 minutes. Compared to their fellow employees, whose travel time is *the most extreme*? **Justify your answer using the concept of *standardized values* (i.e., z-scores).**

Part C - Sampling [21 points]

You wish to estimate the percent of Indiana adults, age 25 and over who participate in organized sports (e.g., bowling leagues, softball teams, etc). You decide to collect your data in person so you go to a shopping mall in Indianapolis on a Saturday afternoon. You set up a booth near the center of the mall with a sign saying, "Fill out survey for a chance at Colts (professional football) tickets!" Your survey asks, "Do you enjoy participating in organized sports?" Circle YES or NO

1. For this survey identify:
[9]

   a. the population

   b. the sampling frame

   c. the sample

2. Identify *three sources of bias* present in this sampling method. Be sure to indicate the *type* of bias (from the five types discussed in class) and the *direction* of the bias (i.e., will the bias most likely cause the percent determined from your survey to be too high or too low). **Explain your answers fully!**
[12]

   a.

   b.

   c.

Part D - Miscellaneous [24 points]

1. Almost all of a normal distribution will fall within _____ standard deviations of the _____ .

[4]

2. Suppose the standard deviation of a set of data is 16. What is the *variance*? **Give a specific value!**

[4]

3. Compute the *standard deviation* of the values: 4, 6, 14 (**Show all work!**)

[6]

4. In a normal distribution the mean is (greater than / equal to / less than) the median. *Choose one* of these answers and *explain* why it is correct.

[4]

5. The following normal quantile plot depicts the distribution of scores for a certain test. What are *two* things that can be observed about the distribution of test scores. **Justify your answers**!

[6]