MATH 210 - Test #1 - 9/25/00

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

Part A - Descriptive Statistics [30 points, 6 each]

You survey 20 students on how many hours they study in a typical week and obtain the following results.

8 9 10 11 11 12 13 14 16 18 20 21 25 25 26 28 28 29 32 34

1. Construct a *stemplot* for this data.

2. Describe the *shape* of this distribution.

3. Compute the 5-number summary. (Using the list above, show where these values came from!)

4. Use the *IQR test* to show that no outliers are present in this data.

5. Construct a *boxplot* for this data.

Part B - Normal Distributions [28 points, 7 each]

You are measuring the weight of an object that weighs exactly 50 lbs. However due to random fluctuations in the weighing procedure, repeated weighings are *normally distributed* with a mean of 50 pounds and a standard deviation of 1 pound. You plan to measure the object many times.

1. State a specific range, centered at 50 pounds, that will contain at least 99% of your measurements.

2. What percent of these measurements will be *above* 51.5 pounds?

3. What percent of these measurements will be *between* 49.75 and 51.5 pounds?

4. Find the 75^{th} percentile for these measurements and ***explain the meaning of your answer*** in the context of the problem.

Part C - Sampling [18 points]

For a class project, you wish to estimate the percent of adult United States citizens who are planning to vote for George W. Bush in the presidential election. Unfortunately you put off doing this project and only have one week left. You quickly obtain a list of registered voters in Indiana. You call the first 500 people on the list and ask them "Are you planning to vote for George W. Bush, the next President of the United States?"

1. For this poll identify the:

   a. population

   b. sampling frame

   c. sample

2. Pick *any three* of the following types of bias and indicate how it appeared in this poll. **Be sure to give a specific reason why the poll's result would likely be different than the correct percentage for the entire population of interest.** For extra credit [+3] give additional reasons why this polling method contains bias.

   a. Unrepresentative sampling frame

   b. Nonresponse

   c. Voluntary response

   d. Leading question

   e. Response bias

Part D - Miscellaneous [24]

1. Suppose you score an 18 on the math portion of the ACT test, while your friend scores 500 on the SAT math test. Both tests are scored so the results follow *normal* distributions. Assuming the tests measure the same type of ability, you wish to compare the two test scores.

[8]

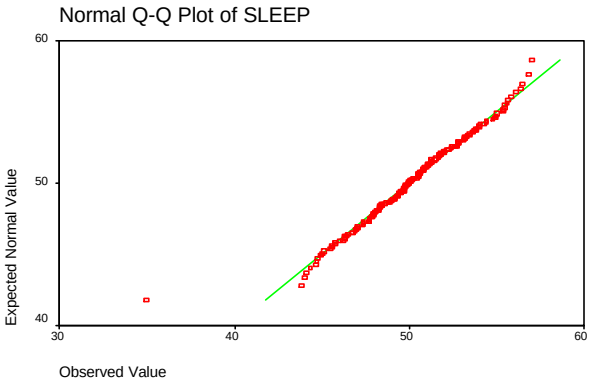
a. To make this comparison, what other information would you need to know about the distributions of the ACT and SAT scores?

b. Describe how would you use the information from (a) to determine who has the better score.

2. You survey 200 students on campus and ask them how many hour per week they sleep.

[7]

a. You make a normal quantile plot of your data and obtain the following. What observations do you make about your data? **Justify your observations!**



b. Which would be the best way to describe your data — using the mean and standard deviation, or the median and IQR? **Explain your answer**, including a discussion of the effect of any unusual data values.

3. Which numerical measure tells you how much a set of data varies from its mean?

[4]

4. In as skewed distribution, which measure of center tends to be closer to the majority of the observations — the mean or the median? **Explain!**

[5]