MATH 210 - Test #1 - 2/24/00

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

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

In a class of 20 students you weigh everyone (in pounds) and record the following results:

111 115 120 126 130 134 138 142 148 150 158 160 164 166 178 182 191 205 216 240

1. Construct a stemplot to represent this data. Let each stem represent a multiple of 10. *Draw your plot on the provide sheet.*

2. Describe the overall pattern in the data and *explain this pattern in the context of the data.*

3. Compute the five-number summary for this data.

4. Use the appropriate numerical test to determine if any of the high or low values should be considered outliers.

5. Draw a boxplot of this data.

6. Which of the normal quantile plots on the attached sheet represents this data? *Explain.*

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

Suppose that the grades in a particular course are normally distributed with a mean of 75 and a standard deviation of 8.

1. If the grades are on a standard 100 point scale (A=90+, B=80+, C=70+, D=60+ etc.) *explain in detail* why this might be a reasonable model representing the distribution of grades.

2. What proportion of students receive an A in this course (90 or above)?

3. What proportion of students receive a C (from 70 to 80)?

4. Determine the 75^{th} percentile for the grades in this course and *explain the meaning of your answer*.

Part C - Sampling [18 points]

Your project group wishes to the estimate the percent of M.C. students who believe convo is a worthwhile program. To obtain a large number of responses quickly you plan to stand outside Cordier Auditorium on Monday morning and ask the following question to students leaving convo.

> *"Do you think that the convocation program is an important part of Manchester's academic program?"*

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.]

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

Part D - Miscellaneous [24 points]

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

[4]

1. According to a the Wabash Economic Development Corporation, in 1998 the median household income in Wabash County was $35,588 and the mean was $46,356.

[12]

a. Given what you know about the distribution of monetary values, why you would expect the mean to be greater than the median?

b. Sketch the type of histogram you would expect to obtain if you did a comprehensive survey of Wabash county household incomes. (Be sure to mark on your graph the two values cited above.)

c. In this example, which gives a better representation of the "typical" or "average" household income — the mean or the median? *Explain!*

d. If you wish to measure the variation in household income which should you use — the inter-quartile range (IQR) or the standard deviation? *Explain!*

3. You collect data representing weights (in pounds) of M.C. students. Which of the following measures are ***not*** in units of pounds? (*Circle all that are appropriate*.)

[4]

Mean	Median	Std. Deviation	IQR	Range
Variance	Q_3	20^{th} %-tile		

4. In the study in **Part C**, which students constitute the *sampling frame*?

[4]