MATH 103 - Test #3 - 11/17/00

Show all work for maximum credit. You may use the following formulas as needed. Points in [brackets] total 100.

$$\textbf{E.V.} = \Sigma\, p_i x_i \qquad z = \frac{X - \mu}{s}$$

1. A restaurant records the number of children (X) that are present in each party of customers. Based on a large amount of data they construct the following probability distribution for X.

Children	(X_i)	0	1	2	3	4	5	6
Probability	(p_i)	.35	.25	.20	.10	.05	.04	.01

a. What is the *expected* number (i.e., average) number of children per party at this restaurant?

[10]

b. You pick a day at random and observe the first five parties entering the restaurant. Suppose you compute a mean of 5 children per party. Does this contradict your answer to (a)? **Explain!**

[4]

2. State three characteristics of any normal curve.

[6]

a.

b.

c.

EXTRA CREDIT [+2] **State two more characteristics of any normal curve.**

3. Suppose that birth weights of full-term baby boys in the U.S. are normally distributed with a mean of 7 pounds and standard deviation of .5 pounds.

[21]

a. What percentage of baby boys weigh *between* 7 and 8 pounds?

b. What percentage weigh *above* 8 pounds?

c. What percentage weigh *between* 5.5 and 8 pounds?

d. Construct intervals that contain the following percentages of boys' birth weights.

[9]

68%

95%

99.7%

4. You ask 16 students to record how many hours they sleep in the coming week. The following values are reported:

44 45 46 47 48 49 50 52 53 54 55 58 60 63 69 84

a. Construct a frequency table by grouping the data into nine classes, each including a range of five values. The table below gives the first two classes. **Define the remaining classes in an appropriate way and fill in the frequency for each class.**

[8]

Class	Frequency
40–44	
45–49	

b. Use your frequency table to make a histogram (bar chart) of the data you collected.

[8]

c. Describe the *main features* and *pattern* of your histogram and any *exceptions* to the overall pattern.

[5]

d. Based on your answer to (c), which do you expect to be greater, the mean or the median? **Justify your answer!**

[3]

e. Compute the mean and median for this data. **Show your work!**

[8]

Mean: $\mu =$

Median: M =

5. Consider the following polling scenario. The South Bend Chamber of Commerce wishes to study the opinions of married men in South Bend regarding the subject of holiday shopping. A survey team goes to Scottsdale Mall (in South Bend) on the first Saturday of December. They ask the following question to the first 100 men they meet entering the mall. "Do you enjoy shopping with your spouse during the holiday season?"

[9]

a. *In the context of this particular poll*, describe the:

i. population of interest

ii. sampling frame

iii. sample

b. Identify three reasons why this poll may give biased results when trying to describe the entire population of interest. Support your answers — that is, explain why this bias will likely occur.

[9]

i.

ii.

iii.

EXTRA CREDIT [+2] **Identify two additional sources of bias in this poll.**