

MATH 103 - Test #3 - 4/25/02

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

$$z = \frac{X - \mu}{\sigma} \qquad m = z/2\sqrt{n} \qquad n = (z/2m)^2$$

1. Suppose the time students spend eating lunch in the cafeteria is normally distributed with a mean of 26 minutes and standard deviation of 4.

[18]

- a. What percentage of students spend *between* 20 and 30?

- b. What percentage spend *less than* 15 minutes?

- c. What percentage spend *more than* 26 minutes?

[6]

- d. Construct three separate intervals containing the following percentages of students.

68%

95%

“Almost 100%”

2. You ask sixteen students to record how many hours they watch TV in a given week. The following values are reported:

0 7 8 11 13 14 16 16 17 19 20 21 22 23 24 24

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

[5]

<u>Class</u>	<u>Frequency</u>
0–4	

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

[7]

- c. Describe the *shape* of your histogram and any *exceptions* to the overall pattern.

[5]

- d. Based on your answer to (c), which will be lower, the mean or the median? **Explain your answer in detail.**

[3]

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

[6]

Mean:  $\mu =$

Median:  $M =$

3. You are interested in determining the percentage of adults in the Ft. Wayne who think more money should be spent to protect the environment. You go to a Ft. Wayne park on a sunny Saturday afternoon and asked the first 200 people you see “Do you favor protecting the environment?” Of the 200 people surveyed 150 say “yes.”

a. Compute the *sample result* — that is, the percentage of people in your survey who answered “yes.”

[3]

b. Using a 90% confidence level, compute the *margin of error* for the percentage you calculated in (a).

[5]

c. *Construct a confidence interval* for the true percentage of adults in Ft. Wayne.

[5]

d. Interpret the meaning of your confidence interval, in the context of this study. **Use a complete sentence.**

[5]

e. Suppose you wanted your poll to be accurate to within 1%. Still using 90% confidence, how many people must be included in your survey to obtain this margin of error?

[5]

f. Identify two possible *sources of bias* in this poll.

[5]

4. Miscellaneous

- a. In a skewed distribution which is a better representation of the majority of the data values — the mean or the median? **Explain your answer.**

[4]

- b. State three characteristics of any normal curve.

[6]

▶

▶

▶

- c. When estimating a percentage for a large population, the margin of error can be *decreased* by using either a ( larger / smaller ) sample or a ( higher / lower ) confidence level. [Circle the correct words.]

[4]

- d. Describe the *sampling frame* used in Question #3.

[4]

- e. Give an example of the type of data that often follows the following patterns.

[4]

▶ single-peaked and symmetric

▶ skewed right