

# Exam #2

Math 114-B

Thursday, April 8, 1999

Show your answers to four decimal places wherever possible.

1. Describe sampling bias, and give an example of sampling bias that we have not discussed in class or on homework.

2. Find a regression model for the following data, and also find and interpret the proportion of variability explained by the model.

x	99	36	96	91	19	100	51	84	64	75
y	1	8	2	3	9	0	7	4	6	5

3. Find a regression model for the following data, and then find all of the fitted values for the data set.

x	1	5	8	4	9
y	0	124	511	63	728

4. Let  $X$  be a normal random variable with mean 35 and standard deviation 12. Find  $k$  such that  $\Pr(X > k) = 0.15$ .

5. Use the following data to construct the conditional distribution (percentages) for commuters and the conditional distribution for non-commuters. Construct a segmented bar chart with one segmented bar each for commuters and non-commuters.

	Freshman	Sophomore	Junior	Senior
Commuter	15	45	55	60
Non-commuter	885	855	845	840

6. Explain what residuals are, and what to look for in a residual plot.
7. Explain how the standard deviation of  $\hat{p}$  depends on  $\theta$  and  $n$ . What values of  $\theta$  make the standard deviation of  $\hat{p}$  smallest or largest?
8. 63% of the voters in a given city are in favor of the construction of a new public library. If a random sample of 125 of them is surveyed, what is the probability that over 60% of the sample will support the construction?
9. Give two reasons why we work with samples instead of populations.
10. Explain the Central Limit Theorem and why it works.