

**Time: 2 hrs.
June 9, 2000**

Form Number: 2

**MATH 207
FINAL EXAM
Second Semester 99-00**

- Instructions:**
- 1) Round answers to 2 places after the decimal point.
 - 2) Write down the number of the form you are answering on the top left corner of the front cover of your answer sheet.
 - 3) Show your work in all the problems.

1. The physical education teachers in a large school district administer a physical performance test to a random sample of 61 seventh grade boys. The sample mean is $\bar{x} = 84.20$, and the standard deviation is $s = 8.48$.

Find the 95% confidence interval for the mean physical performance score of the population of seventh grade boys in this district.

2. The scores of the Graduate Record Exam (GRE) are transformed so that they have a mean of 500 and a standard deviation of 100. Furthermore the scores are known to be normally distributed. Let \bar{x} denote the mean score of a sample of scores.

- a) For samples of size 70, determine the mean and standard deviation of \bar{x} .
- b) If a random sample of 70 GRE scores is chosen, what is the probability that its mean \bar{x} is within 25 points of the population mean?

3. When a balanced coin is tossed 4 times, 16 equally likely outcomes are possible. (H stands for heads and T for tails.) The outcomes are:

HHHH	TTTT	HTTT	TTHT
HHHT	TTTH	THHT	THTT
HHTT	TTHH	HTHT	HTHH
HTTH	THHH	THTH	HHTH

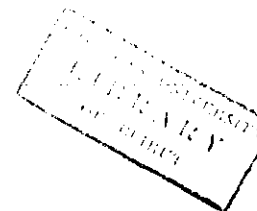
Let X denote the total number of tails in the four tosses.

- a) What are the possible values of X?
- b) Find the probability of getting 3 tails.
- c) Obtain the probability distribution of X.

4. a). To construct a confidence interval for a population mean, a sample of mean 33.8 was used. The margin of error in the estimation was 4.8. Find the confidence interval.

b) If the standard deviation of a normally distributed population is 12, find the sample size required to have a margin of error of 3 and a 99% confidence level in estimating the population mean.

(Note: Parts (a) and (b) are independent.)



5. In a large city, the mean value lost due to purse snatching was \$279 in 1997. For last year, 36 randomly selected purse-snatching offenses have a mean value lost of \$300 with a standard deviation of $s = \$75$. At the 5% significance level, do the data provide sufficient evidence to conclude that the mean value lost due to purse snatching last year has increased from the 1997 mean. Use the critical value approach.

6. In a certain city in 1998, the mean telephone expenditure per consumer unit was \$495. For last year, a random sample of 40 consumer units had a mean of \$465. At the 10% significance level, do the data provide sufficient evidence to conclude that last year's mean telephone expenditure per consumer unit has decreased over the 1998 mean? (Assume $\sigma = \$130$.) Use the p-value approach.