

31/1/03

Time: 2 hours

**STAT 201
Final Exam
First Semester, 02-03**

1. Student scores on the GRE exam are transformed so that they have a mean of 500 and a standard deviation of 100. Furthermore, the scores are normally distributed.

- a) Find the quartiles for the GRE scores.
- b) Find the 99th percentile score.

2. The weights of all people living in a town have a distribution that is skewed to the right with a mean of 60.5 kg. and a standard deviation of 10.9 kg.

a) Let \bar{x} be the mean weight of a random sample of 45 persons selected from this town. Find the mean and standard deviation of \bar{x} and comment on the shape of its sampling distribution. Explain.

- b) Find the probability that \bar{x} is between 60 and 61kg.

3. The average hourly wage of fast-food workers employed by a large chain is \$6. The standard deviation is \$1.5. The hourly wages of the workers are normally distributed.

- a) Find the probability that a randomly selected fast-food worker for this chain has an hourly wage of \$7 or more.
- b) If 25 randomly selected workers for this chain are chosen, find the probability that their mean hourly wage is \$7 or more.
- c) Why is the answer to part (b) smaller than the answer to part (a)? Give a clear reason.

4. Two samples of 100 observations each, taken from the same population, produced the following sample means and standard deviations:

<u>Mean</u>	<u>Standard Deviation</u>
56.25	7.9
57.40	7.5

- a) From the data of each sample, make a different 90% confidence interval for the population mean μ .
- b) The true population mean is 55.8. One of the confidence intervals found above doesn't contain 55.8. How could this happen? Explain.

5. Suppose, for a sample selected from a normally distributed distribution, $\bar{x} = 65.50$ and $s = 8.6$.

- Construct a 95% confidence interval for μ , assuming $n = 16$.
- Construct a 90% confidence interval for μ , assuming $n = 16$.
- Which of the intervals found in (a) or (b) gives a more precise estimate of μ . Justify your answer.

6. A department store manager wishes to estimate at a 90% confidence level the mean amount spent by all customers at this store. From an earlier study, the manager knows that the standard deviation of amounts spent by customers at this store is \$27. What sample size should he choose so that the estimate is within \$3 of the population mean? (Assume that the amounts spent by customers at this store are normally distributed.)

7. A store manager wishes to find out whether there is a relation between ages of employees and the number of their absences a year. She used a random sample of 6 employees and collected the following data for the sample:

Age x	:	18	26	39	48	53	58
Number of Absences y :		16	12	9	5	6	2

- Calculate the linear correlation coefficient, r , for the data.
- Interpret the value of r , obtained in (a), in terms of the linear relationship between age and number of absences of the employees.

Hint: $\Sigma x^2 = 10998$, $\Sigma y^2 = 546$.

