KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 121

STAT 211: BUSINESS STATISITICS I

Final Exam Tuesday January 8, 2013

Please check/circle your instructor's name

□ Al-Sabah □ Saleh .

Name: _____ ID #: _____ Section#_____

☺ Important Note:
Show all your work including formulas, intermediate steps and final answer.

Question No	Full Marks	Marks Obtained
1	5	
2	4	
3	6	
4	6	
5	12	
6	8	
7	19	
Total	60	

1) 80% of all customers applying for a loan at a bank are accepted. Suppose that 50 new loan applications are selected at random.
   a) Find the expected value and the standard deviation of the number of loans that will be accepted by the bank. *(2 pts.)*

   b) What is the probability that at least 42 loans will be accepted? Justify your method. *(3 pts.)*

2) A survey indicates that 50% of Khobar residents own a home, 80% own a car, and 90% of the homeowners also own a car. What proportion of residents
   a) own both a car and a house? *(2 pts.)*

   b) own a car or a house, or both? *(1 pt.)*

   c) own neither a car nor a house? *(1 pt.)*

3) An official from the securities commission estimates that 60% of all investment bankers have profited from the use of insider information. If 10 investment bankers are selected at random from the commission's registry, find the probability that:
   a) at most 2 have profited from insider information. *(3 pts.)*

   b) at least 9 have profited from insider information. *(3 pts.)*

4) A certain brand of lamps has a lifetime that is normally distributed with a mean of 3,750 hours and a standard deviation of 300 hours.
   a) What proportion of these lamps will last between 3000 and 4000 hours? *(4 pts.)*

   b) What lifetime should the manufacturer advertise for these lamps in order that only 2% of the lamps will burn out before the advertised lifetime? *(2 pts.)*

5) The following data give the number of cars owned for a population of 4 families

Family	A	B	C	D
Number of Cars Owned	2	1	4	3

a) Find the mean and the standard deviation for the population. *(3 pts.)*

b) List all possible samples of 2 families that can be selected without replacement from this population, and compute the sample mean $\bar{X}$ for each sample. *(4 pts.)*

c) Find the sampling distribution of $\bar{X}$. *(2 pts.)*

d) Use the sampling distribution and calculate the mean and the standard deviation of $\bar{X}$. *(3 pts.)*

6) 42 workers were randomly divided into two sets of 21 each. Each set spent two weeks in a self-training program that was designed to teach a new production technique. The first set of workers was accompanied by a supervisor, while the second group was left on its own. After the program ended, the workers were tested to determine the mean time of production. The results were as follows:

	Mean	Standard Deviation
Supervised group	70.6	8.4
Unsupervised group	77.4	8.0

a) Estimate the true difference between the two population mean times using a 95% confidence interval. *(3 pts.)*

b) Do you agree with the claim that supervision had no effect on the performance of the workers? Justify your answer. *(2 pts.)*

c) What assumptions are necessary for your analysis? *(3 pts.)*

7) An auditor for a furniture store wants to estimate the mean value of the desks in stock. He wants a 99% confidence that his estimate of the mean value is correct to within ±$80. He does not know what the population standard deviation of the value of a desk is, so he has selected the following pilot sample (in units of $100):

14.8 15.4 15.8 16.2 16.4 17 17.2 17.8 17.9 18.1 18.3 18.6 19 19.5

a) Before starting the analysis, he decides to construct a box plot. Help him construct the box plot, explain it and comment on the shape of the distribution. *(7 pts.)*

b) Based on the pilot sample, how many **more** desks should he select? *(4 pts.)*

c) Calculate and ***interpret*** a 99% confidence interval for the total value of the desks in stock if there were 250 desks in stock. *(7 pts.)*

d) Do you need to make any assumptions about the distribution of values? If yes, what? *(1 pt.)*