

**DEPARTMENT OF MATHEMATICAL SCIENCES
DHAHRAN, SAUDI ARABIA**

STAT 211: BUSINESS STATISTICS I

Semester 042

Final Exam

Monday June 6, 2005

12:30- 2:30 pm

Please **circle** your instructor ' s name:

- Marwan Al-Momani
- Mohammad F. Saleh
- Walid S. Al-Sabah

Name: _____ ID# _____ Section _____

Instructions:

- Write clearly and legibly
- All steps are important
- As well as the final answer
- Write answers to 3 decimal places

Question Number	Full Marks	Marks Obtained
1-5	12	
6	3	
7	9	
8	31	
9	14	
10	11	
11	10	
Total	90	

Part I

- 1) All of the following are used to describe quantitative data except the (2 points)
- Histogram
 - Stem and Leaf
 - Dot Plot
 - Pie Chart
- 2) When developing a frequency distribution the class (2 points)
- Intervals should be large.
 - Intervals should be small.
 - Boundaries should be integer.
 - Intervals should be mutually exclusive.
 - Intervals should always be equal
- 3) A quantity that measures the variation of a population or a sample relative to its mean is called the _____ (2 points)
- Range
 - Standard deviation
 - Coefficient of variation
 - Variance
 - Interquartile range

In a general studies course, the students are classified according to their level, junior or senior, and according to the grade received, C or otherwise. The classification is as follows:

	C	\bar{C}	
Junior	.45	.25	.70
Senior	.05	.25	.30
	.50	.50	1.00

Use this information to answer questions 4 and 5 (3 points each)

- 4) What is the probability that a randomly selected student is a junior C student?
- 0.70
 - 0.50
 - 0.45
 - 0.35
- 5) If the student chosen is a senior, what is the probability that he is a C student?
- 0.30
 - 0.16
 - 0.05
 - 0.015

Part II

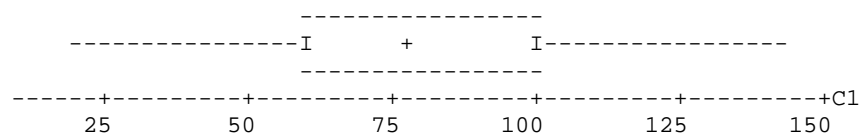
- 6) An employee in a sport company makes 10 sales calls each day, if the chance of making a sale on each call is 0.30. What is the probability that he will make exactly two sales? *(3 points)*
- 7) The distribution of gripping strengths of industrial workers is unknown with mean 110 and standard deviation of 10. A sample of 75 workers is selected at random from this distribution.
- a) If the sample yields a mean of 111.5, find the sampling error. *(1 point)*
- b) What is the sampling distribution, mean and standard error of the sample mean? *(3 points)*
- c) What is the probability that the sample mean is between 109 and 112? *(5 points)*

- 8) Purchasers of bicycles also purchase several accessories. A random sample of 12 customers, gave the following amounts in SR for sales of accessory equipment:

19	38	58	63	65	76
77	82	93	107	114	142

- a) Find the mean, median, range, first quartile, third quartile, and standard deviation. *(14 points)*

- b) Below is the box plot for the sales data. *(2 points)*



Interpret it.

- c) What assumption do you need to construct a confidence interval? *(2 points)*

- d) Does the box plot support your assumption? Explain *(2 points)*
- e) Obtain a 90% confidence interval for the population mean sales of accessories. *(5 points)*
- f) Does this interval cover the true mean? Explain *(2 points)*
- g) Assuming the sample you have is a pilot sample, how many additional observations are needed to estimate the population mean by a 95% confidence interval and a margin of error ± 5 . *(4 points)*

9) Most major airlines allow passengers to carry two pieces of luggage onto the plane. One airline is considering changing its policy to allow only one carry-on per passenger. Before doing so, it decided to collect some data. Specifically, a random sample of 1000 passengers was selected. The passengers were observed and the number of bags carried on the plane was noted. Out of the 1000 passengers, 345 had more than one bag.

a) Based on this sample, develop a 95% confidence interval estimate for the population proportion of passengers who carry more than one bag. *(4 points)*

b) Interpret this confidence interval. *(2 points)*

c) What important result are you using to construct the interval, and what assumptions are needed? *(2 points)*

d) If a certain type of planes has a capacity of 568 passengers. Determine an interval estimate of the number of passengers you would expect to board the plane carrying more than one piece of luggage. Assume the plane is at its full passenger capacity. *(2 points)*

e) Find the required sample size to obtain a 95% confidence interval estimate of the true proportion with an error of margin no more than 2%. *(4 points)*

10) Two machines are used to fill plastic bottles with dishwashing detergent. The standard deviations of fill volume are known to be 0.10 fluid ounces and 0.15 fluid ounces for the two machines, respectively. Two random samples of size 12 bottles from machine one and 10 bottles from machine two are selected, and the sample mean fill volume are 30.87 fluid ounces and 30.68 fluid ounces.

a) What are the assumptions needed to construct a confidence interval estimate for the mean difference in the fill volume? *(3 points)*

b) Construct a 98% confidence interval for the mean difference in the fill volume. *(8 points)*

11) The government awarded grants to the agricultural departments of 6 universities to test the yield capabilities of two new varieties of wheat. Each variety was planted on plots of equal area at each university and the yields, in kilogram per plot, recorded as follows:

Variety	University					
	A	B	C	D	E	F
One	38	23	35	41	44	29
Two	45	25	31	38	50	33

a) What type of experiment was conducted? *(2 points)*

b) Find a 95% confidence interval for the mean difference between the yields of the two varieties. *(8 points)*