KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

DHAHRAN, SAUDI ARABIA

STAT 212: BUSINESS STATISTICS II

Semester 111
Major One
Wednesday Oct 12, 2011
Allowed time 80 minutes

Please **circle** your:

Instructor	**section number**	
Mohammad Saleh	Sec 4: (10:00 – 10:50)	Sec 5 : (11:00 – 11:50)
Musawar Malik	Sec 3: (9:00 –9:50)	

Name: Student ID#: Serial #:

Directions:

1) You must **show all work** to obtain full credit for questions on this exam.
2) **DO NOT round** your answers at each step. Round answers only if necessary at **your final step to 4 decimal places**.

Question No	Full Marks	Marks Obtained
Q1	15	
Q2	15	
Q3	10	
Q4	10	
Q5	10	
Total	60	

Question One (15 points)

A bank branch located in a commercial district of a city has developed an improved process for serving customers during the noon – to 1:00 p.m. lunch period. The waiting time (defined as the time the customer enters the line until he reaches the teller window) of all customers during this hour is recorded over a period of one week. A random sample of fifteen customers is selected, and the results are as follows:

4.31	5.55	3.02	5.13	4.77	2.34	3.54	3.30
0.38	5.12	6.46	6.19	3.79	6.10	4.50	

If you know that $\sum x = 64.5,\ and\ \sum (x - \bar{x})^2 = 296.1206$, then

a. At 5% level if significance, is there evidence that the population standard deviation is more than 2 minutes?

1. The hypotheses:

2. The critical value(s):

3. The test statistics:

4. The decision rule:

5. the decision:

6. The conclusion

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b. At 5% level if significance, is there evidence that the population mean waiting time is less than 5 minutes?

1. The hypotheses:

2. The critical value(s):

3. The test statistics:

4. The decision rule:

5. the decision:

6. The conclusion

Question Two (15 points):

Two professors wanted to study how students from their universities compared in their capabilities using MINITAB in undergraduate information systems courses. A comparison of the student demographics was also performed. One school is a state university in the Western and the other school is a state university in the Eastern. The following table contains information regarding the ages of the students

School	Sample size	Mean age	Standard deviation
Western	25	22.30	2.01
Eastern	30	21.02	1.28

a. At 2% level of significance, is there any evidence of a difference between the variances in age of students at the Western school and at the Eastern school?

1. The hypotheses:

2. The critical value(s):

3. The test statistics:

4. The decision rule:

5. the decision:

6. The conclusion

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b. At 1% level of significance, is there any evidence of a difference in the mean age of students at the Western school and at the Eastern school?

1. The hypotheses:

2. The critical value(s):

3. The test statistics:

4. The decision rule:

5. the decision:

6. The conclusion

Question Three (10 points):

Are women more risk averse in the stock market? A sample of men and women were asked the following question:"If both the stock market and the stock you owned dropped 25% in three months, would you buy more shares while the price is low?". Of 965 women, 338 said yes. Of 1066 men, 554 said yes. At 4% level of significance, is there evidence that the percentage of women who would buy more shares while the price is low is less than the percentage of men?

1. The hypotheses:

2. The critical value(s):

3. The test statistics:

4. The decision rule:

5. the decision:

6. The conclusion

Question four (10 points):

A plan for an executive traveler's club has been developed by an airline on the premise that at least 6% of its current customers would qualify for membership. A random sample of 500 customers yielded 40 who would qualify. If you need to prove that that the company's premise is correct

1. (*2 points*) State the null and alternative hypotheses.

2. (*8 points*) Find the observed level of significance of the test and interpret it? Briefly explain how to use it for testing the hypotheses. Use 1% level of significance

Question five (10 points):

Part a) Choose the correct answer

1. For a given sample size *n*, if the level of significance (α) is decreased, the power (1 – β) of the test
   a. Will increase.
   b. Will decrease.
   c. Will remain the same.
   d. Cannot be determined.

2. A Type II error is committed when
   a. We reject a null hypothesis that is true.
   b. We don't reject a null hypothesis that is true.
   c. We reject a null hypothesis that is false.
   d. We don't reject a null hypothesis that is false.

3. It is possible to directly compare the results of a confidence interval estimate to the results obtained by testing a null hypothesis if
   a. A two-tailed test for μ is used.
   b. A one-tailed test for μ is used.
   c. Both of the previous statements are true.
   d. None of the previous statements is true.

4. In order to determine the p-value, which of the following is not needed?
   a. The level of significance
   b. Whether the test is one or two tail
   c. The value of the test statistic
   d. All of the above are needed

5. If a hypothesis is not rejected at the 0.10 level of significance, it:
   a. Must be rejected at the 0.05 level
   b. May be rejected at the 0.05 level
   c. Will not be rejected at the 0.05 level
   d. Must be rejected at the 0.025 level

Part b) which of the following true and which false?

1. For a given sample size, the probability of committing a Type II error will increase when the probability of committing a Type I error is reduced.

2. If a researcher accepts a false null hypothesis, he has made a Type-I error.

3. If a researcher do not accepts a false null hypothesis, he has made a Type-II error.

4. A two-tail test is a test in which a null hypothesis can be rejected by an extreme result occurring in only one direction.

5. There is an inverse relationship between the probabilities of Type I and Type II errors.

For question 5, write your answer in the table

Multiple choice

1	2	3	4	5

True or False

1	2	3	4	5