KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 152

STAT 212 BUSINESS STATISTICS II

First Major Exam

Allowed time 75 minutes

Wednesday February 17, 2016

Name:_____ ID #:_____ Section #:_____ Srl #:____

Important Note:

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
*Q*1	5	
*Q*2	5	
*Q*3	11	
*Q*4	10	
*Q*5	14	

Total	**45**	

Question One: (5 *points*)

Answer the following questions by indicating it is **T**rue or **F**alse

a. In hypothesis testing, the null hypothesis should contain the equality sign.

b. In testing a hypothesis, statements for the null and alternative hypotheses as well as the selection of the level of significance should precede the collection and examination of the data.

c. A one-tailed hypothesis for a population mean with a significance level equal to .05 will have a critical value equal to z = .45.

d. In a one-tailed hypothesis test, the larger the significance level, the greater the critical value will be.

e. When a hypothesis test is two-tailed, the level of significance must be twice as large as when the test is one-tailed.

Question Two: (5 *points*)

Answer the following questions by choosing the right answer.

1. When formulating a hypothesis test, which of the following statements is true?

   a. The null hypothesis should never contain the equality.
   b. The null and alternative hypotheses should be stated in terms of the population value.
   c. If possible, the research hypothesis should be formed as the null hypothesis.
   d. The null hypothesis should be established such that the chance of making a Type I error is minimized.

2. Which of the following would be an appropriate null hypothesis

   a. The mean of a population is equal to 55.
   b. The mean of a sample is equal to 55.
   c. The mean of a population is greater than 55.
   d. Only (a) and (c) are true.

3. If the *p* value is less than α in a two-tailed test,

   a. the null hypothesis should not be rejected.
   b. the null hypothesis should be rejected.
   c. a one-tailed test should be used.
   d. more information is needed to reach a conclusion about the null hypothesis.

4. The reason for using the t-distribution in a hypothesis test about the population mean is:

   a. the population standard deviation is unknown and the sample size is fairly small.
   b. it results in a lower probability of a Type I error occurring.
   c. it provides a smaller critical value than the standard normal distribution for a given sample size.
   d. None of the above would be a reason for using the t-distribution.

5. In a two-tailed hypothesis test for a population mean, an increase in the sample size will:

   a. have no affect on whether the null hypothesis is true or false.
   b. have no affect on the significance level for the test.
   c. result in a sampling distribution that has less variability.
   d. All of the above are true.

Question Three:

According to the National Funeral Homes Association, all the funeral houses collected an average $5020 with a standard deviation of $1100 in 1998 up from 1996. In early 2000, a random sample of 12 funeral homes reported the following revenues (in thousands of dollars).

6.1	4.9	5.4	5.9	7.1	5.7
8.1	7.0	4.5	5.3	5.9	5.9

a. Construct a 97% confidence interval for the average revenue of all funeral homes in 2000. (5 *points*)

b. Using the confidence interval in part a, test that the average revenue of all the funeral homes in 2000 is different from that in 1998? (3 *points*)

c. Referring to your answer in part (b), which of the two statistical errors might have made in this case? Explain. (2 *points*)

d. Do you need any assumptions? If yes, what? (1 *point*)

Question Four:

A company that makes and markets a device that is aimed at helping people quit smoking claims that at least 70 percent of the people who have used the product have quit smoking. To test this, a random sample of $n = 80$ product users was selected and found out that only 60 quit smoking. Test this claim using 4% level of significance.

a. Construct the appropriate null and alternative hypotheses. (1 *point*)

b. Are the assumptions of the test satisfied? Explain. (2 *points*)

c. Compute the test function and the boundary of the region for which H_0 can be rejected. (2 *points*)

d. Do you think that the claim of the company is justified? Explain? (3 *points*)

e. Interpret the 4% significance level in the context of this problem. (2 *points*)

Question Five:

A manufacturer of paper products wants to compare the variation in daily production levels at two paper mills. Independent random samples of days are selected from each mill and the production levels (in units) are recorded. The following summary information was obtained assuming that production levels of both mills are normally distributed:

Mill 1	**Mill 2**
$n_1 = 13$	$n_2 = 18$
$\bar{x}_1 = 26.3$	$\bar{x}_2 = 19.7$
$s_1 = 8.2$	$s_2 = 4.7$

a. At 5% level of significance, is there evidence of difference in the variability of the production levels at the two paper mills? (6 *point*s)

b. To solve part c below, do you need any assumptions? If yes, what? If no, why? (2 *point*s)

c. At 5% level of significance and using the *p*-value approach, is there evidence that Mill 1 average no more than 3 units more than Mill 2? (6 *point*s)

With my Best Wishes