KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 131

STAT 213 Statistics for Actuaries

Third Major Exam   Monday December 16, 2013

Name: _____   ID #: _____

☺Important Note:

➢ Show all your work including formulas, intermediate steps and final answer.
➢ In testing problems;
   • state the null and alternative hypotheses,
   • the test statistic,
   • the decision rule,
   • the decision, and
   • the conclusion

Question No	Full Marks	Marks Obtained
1	14	
2	7	
3	14	
4	10	
Total	45	

1) A random sample of 60 motorists during a certain week gave an average of 11.3 gallons of gasoline purchased with a standard deviation of 3.1 gallons. 11 of the 60 motorists motorist purchased premium gasoline.

   a) At the 5 significance level, is there evidence that the population mean amount of gasoline purchased is different from 10 gallons? *(5 pts.)*

   b) What is the p-value of the test? *(1 pt.)*

   c) Do you need any assumptions? If yes, what are they? If not, why? *(1 pt.)*

   d) At the 10% level of significance is there evidence that fewer than 20% of all motorists purchase premium gasoline? *(7 pts.)*

2) The waiting time of a random sample of 15 customers at a bank gave a mean of 4.29 minutes and a standard deviation of 1.64 minutes.

   a) At the 5% significance level, is there evidence that the population mean waiting time is less than 5 minutes? *(5 pts.)*

   b) Do you need any assumptions to perform the test? If yes, what? If no, why? *(1 pt.)*

   c) What is the p-value of the test? *(1 pt.)*

3) A study to compare the amount of time (in hours) spent studying, by two groups of students was conducted giving the following information:

Group A; number of students = 21, mean = 18.6 hours, standard deviation = 7.2 hours

Group B; number of students = 38, mean = 11 hours, standard deviation = 6.6 hours

a) If you want to study whether there is a difference in study time between the two groups. What are the major steps involved in analyzing the data above and reaching a conclusion?   *(2 pts.)*

b) Perform the needed analysis, using a 5% level of significance, at each step.
                                                                        (12 pts.)

4) A company conducted a study about the use of self-managed work teams. A sample of 400 employees were classified according to their job type and attitude toward self-management, and the results are summarized below:

Type of Job	Attitude toward self-management			
	Agree	Neutral	Disagree	Total
Regular Employees	126	58	101	285
Middle Management	35	14	26	75
Upper Management	24	7	9	40
Total	185	79	136	400

At the 5% significance level, is there evidence of a relationship between attitude toward self-management and type of job?   *(10 pts.)*