KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 319: Probability & Statistics for Engineers & Scientists
Semester 143
Second Major Exam
Wednesday July 29, 2015
00:00 pm − 00:00 pm

Please circle your instructor name:

Nasir Abbas   Saddam Abbasi

   Muhammad Riaz   Farah Saleh

Name: ID #:   Section #:   Serial #:

Question No	Full Marks	Marks Obtained
1		
2		
3		
4		
5		
Total		

Q.No.1:- A random sample of size 25 sports utility vehicles (SUVs) for the same year and model revealed the following miles per gallon (MPG) values:

12.4	13.0	12.6	12.1	13.1	13.0	12.0	13.5
11.4	14.4	9.5	13.25	12.4	10.7	11.7	10.0
14.0	10.9	9.9	10.2	11.0	11.9	13.7	12.0
11.3							

a) Calculate the average number of gallons of gasoline would use to travel from Al – Dammam to Al – Riyad, if the distance approximately 290 miles.
b) Calculate the standard deviation of number of gallons of gasoline.
c) Construct a box plot of number of gallons of gasoline, comment on the shape.
d) Construct a frequency histogram including the interval $[10.5, 11.5)$. What type of shape does the distribution of the sample appear to have? Why?
e) Use the sample results to develop a 92% confidence interval estimate for the population mean MPG.
f) According to your answer in part (e), above, do you need any assumptions? If yes, what? If no, why?

Q.No.2:- The manager of a gasoline station wants to study gasoline purchasing habits of motorists at his station. In particular, he decides to focus on two variables:
- The amount purchased by the motorists
- Whether the motorists would consider purchase premium – grade gasoline.

He selects a random sample of 60 motorists during a certain week and found that the mean amount purchased was 11.3 gallons, with standard deviation 3.1 gallons.
a) Set up and <u>interpret</u> a 99% confidence interval estimate of the population mean purchased.
b) Do you need any assumptions in part (a)? If yes, what? If no, why?
c) How many customers need to be selected to have 90% confidence of estimating the population proportion of motorists who purchase premium – grade gasoline to within ± 0.04?

Q.No.3:- A radioactive element disintegrates such that it follows a Poisson distribution. If the mean number of particles emitted is recorded in a one second interval as 69, evaluate the probability of:
a) Less than 60 particles are emitted in 1 second.
b) Between 65 and 75 particles inclusive are emitted in 1 second.

With the Best Wishes