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

STAT 319: Probability & Statistics for Engineers & Scientists

Semester 151

Second Major Exam

Wednesday October 28, 2015

5:10 – 6:40 pm

Please encircle your instructor name:

Abbas

Al-Sawi

Anabosi

Malik

Riaz

Samouh

Name:

ID #:

Section #:

Serial #:

Question No	Full Marks	Marks Obtained
1	07	
2	07	
3	09	
4	09	
5	08	
Total	40	

Q.No.1:- (4+3 = 7 points) The density function of the random variable X , the total number of hours (in units of 100 hours) that a family runs a vacuum cleaner over a period of one year, is

$$f(x) = \begin{cases} \frac{1}{4}(x^2 + x + 1), & 0 < x < 1 \\ \frac{13}{80}(6 - x^2), & 1 < x < 3 \\ 0, & \text{otherwise} \end{cases}$$

a) Is this a valid probability density function? How? Justify your answer.

b) Find the average number of hours per year that families run their vacuum cleaners.

Q.No.2:- (3+4 = 7 points) The length of the tube rods (in cm) is normally distributed with mean 80 cm and standard deviation 0.5 cm. If the length of the tube rod is between 79.4 cm and 80.8 cm, it is considered as non-defective. Otherwise, the rod is declared defective.

a) What is the probability that a randomly selected tube rod is defective?

b) If we have a lot of 2500 tube rods, what is the probability that at least 2100 are non-defective?

Q.No.3:- (2+3+4 = 9 points) The net weight in pounds of a packaged chemical herbicide is uniform for $49.75 < x < 50.25$ pounds.

a) Find the probability that a randomly selected package has a weight between 50 to 50.4 pounds.

b) Find the mean, variance and median of the weight of packages.

c) If a random sample of size 35 packages is selected, what is the probability that the absolute difference between the sample mean and population mean is less than 0.005 pounds?

Q.No.5:- (3+3+2 = 8 points) The accompanying data show the single-leg power at a high workload.

214	191	160	207	180	176	174	205
211	183	252	189	191	221	230	

For the above data, answer the following in detail:

a) Compute the coefficient of skewness and comment on its value.

b) Construct a boxplot and comment on the shape, showing outliers (if any!).

c) Using the z-score, do you think that 252 is an outlier?