HomeWork1

Chapters 1 & 2 (Introduction + Organization and Description of Data)

Q. 1: Define Statistics and discuss the importance of statistical science in engineering.

Q. 2: The following data give the life time (X) measured in months of 40 randomly selected electronic components produced by a company during the year 2011:

X: 7, 16, 92, 29, 6, 12, 11, 8, 18, 19, 6, 24, 9, 23, 22, 12, 19, 26, 12, 11,
17, 23, 19, 16, 24, 9, 17, 26, 22, 29, 16, 18, 14, 18, 18, 20, 16, 22, 19, 25

a) Calculate the mean, median, standard deviation, 30^{th} percentile and interquartile range for these data.
b) Do these data contain an outlier? If so, drop the outlier and recalculate all the measures. Which of these measures changes by a larger amount when you drop the outlier?
c) Which is the better measure of center for these data, the mean or the median? Which is the better measure of spread for the data, the standard deviation or the Inter-Quartile Range? Explain.
d) Check the Empirical Rule for this data.
e) Compute Coefficient of Variation and Coefficient of Skewness. Also interpret these numbers.
f) Calculate standardized scores of the life times.Also calculate the average and standard deviation of the standardized scores.
g) Draw a dot plot and a boxplot of the sample life times.
h) If the lifetime below the 3^{rd} percentile is considered to be too low, does the life time of 11 months is too low?
i) What proportion of life times are more than 20 months?
j) Construct a frequency distribution table (ignoring outliers, if any), draw histogram and comment on shape of the distribution of lifetime of electronic components.

Q3. The following frequency distribution shows the amount of time students of a class spent on internet per day.

Time	f	f/n	F	F/n
$[0,2)$	2			
$[2,4)$	8			
$[4,6)$	10			
$[6,8)$	8			
$[8,10)$	2			

(Here *f* refers to frequency and *F* refers to cumulative frequency)

a. What is the minimum average time a student spent on internet per day?
b. What is the maximum average time a student spent on internet per day?
c. What is the average time a student spent on internet per day?
d. What proportion of students who spent less than two hours or more than 8 hours on internet per day?
e. Draw the relative frequency curve of the time spent by students on internet per day. Comment on the shape of the frequency curve.