Assignment 1

Due date : 3/18/2022

1. For the Ex 1-13 on p24, answer to the following questions by using R.

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a) Use class intervals 10-<20, 20-<30, to construct a histogram of the original data (IDT).

b) Use intervals 1.1-<1.2, 1.2-<1.3, to do the same for the transformed data.

c) Draw the stem and leaf graph for log10.IDT variable

d) Draw the box plot for IDT variable.

The data can be accessed by the following commands.

* install.packages("Devore7")
* Library(Devore7)
* data <- ex01.25;data

2. (Ex 1-45 on page 43) The article “A Thin-Film Oxygen Uptake Test for the Evaluation of Automotive Crankcase Lubricants” (Lubric. Engr., 1984: 75–83) reported the following data on oxidation-induction time (min) for various commercial oils:

87 103 130 160 180 195 132 145 211 105 145 153 152 138 87 99 93 119 129

a) Calculate the sample mean, sample variance, sample standard deviation and sample median.

b) If the observations were reexpressed in hours, what would be the resulting values of the sample variance and sample standard deviation? Answer without actually performing the reexpression.

The data can be accessed by the following commands.

* Library(Devore7)
* data <- ex01.51;data

3. (Slightly modified version of Ex 2-13 on p. 62) A computer consulting firm presently has bids out on three projects. Let , for , and suppose that , , , , , . Compute the probability of the following events.

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4. (Slightly modified version of Ex 2-59 on p82) At a certain gas station, 45% of the customers use regular gas (), 35% use plus gas (), and 20% use premium (). Of those customers using regular gas, only 30% fill their tanks (event B). Of those customers using plus, 60% fill their tanks, whereas of those using premium, 40% fill their tanks.

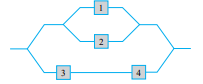
a. What is the probability that the next customer will request plus gas and fill the tank ()?

b. What is the probability that the next customer fills the tank?

c. If the next customer fills the tank, what is the probability that regular gas is requested? Plus? Premium?

5. (Ex 2-62 on p82) A company that manufactures video cameras produces a basic model and a deluxe model. Over the past year, 40% of the cameras sold have been of the basic model. Of those buying the basic model, 30% purchase an extended warranty, whereas 50% of all deluxe purchasers do so. If you learn that a randomly selected purchaser has an extended warranty, how likely is it that he or she has a basic model?

6. (Ex 2-80 on p87) Consider the system of components connected as in the accompanying picture. Components 1 and 2 are connected in parallel, so that subsystem works iff either 1 or 2 works; since 3 and 4 are connected in series, that subsystem works iff both 3 and 4 work. If components work independently of one another and P(component works)=0.9, calculate P(system works).



7. (Slightly modified version of Ex 2-101 on p90) A system consists of two components. The probability that the second component functions in a satisfactory manner during its design life is 0.8, the probability that at least one of the two components does so is 0.96, and the probability that both components do so is 0.65. Given that the first component functions in a satisfactory manner throughout its design life, what is the probability that the second one does also?