5.4.3 Consider a sequence of random variables X_i that are independently identically distributed with a positive state space. Explain why the central limit theorem implies that the random variable

$$X = X_1 \times X_2 \cdots \times X_n$$

has a approximately a lognormal distribution for large values of n

5.4.6 Use your computer package to find the following critical points:

(a) $\chi^2_{0.12,8}$ (b) $\chi^2_{0.54,19}$ (c) $\chi^2_{0.023,32}$

If the random variable X has a chi-square distribution with 12 degrees of freedom, use your computer package to find:

(d) $P(X \leq 13.3)$

(e) $P(9.6 \leq X \leq 15.3)$

5.4.8 Use your computer package to find the following critical points:

(a) $t_{0.27,14}$ $(b)t_{0.09,22}$ $(c)t_{0.016,7}$

If the random variable X has a t-distribution with 22 degrees of freedom, use your computer package to find:

(d) $P(X \leq 1.78)$

(e) $P(-0.65 \leq X \leq 2.98)$

(f) $P(|X| \geq 3.02)$

5.4.10 Use your computer package to find the following critical points:

(a) $F_{0.04,7,37}$ (b) $F_{0.87,17,43}$ (c) $F_{0.035,3,8}$

If the random variable X has an F-distribution with degrees of freedom $\nu_1 = 5$ and $\nu_2 = 33$, use your computer package to find:

(d) $P(X \geq 2.35)$

(e) $P(0.21 \leq X \leq 2.92)$

6.2.2 **For chapter6 problems, using the "Excel data sets" uploaded on KLMS.**

Software Evaluations

DS 6.2.2 shows the evaluations of a new piece of software from a group of 60 trial users. Construct a bar chart and a pie chart for the data set.

6.2.4 **Physical Training Course Completion Times**

DS 6.2.4 shows the times taken by 25 students to finish a physical training course. Construct a histogram of the data set with appropriate band widths. Do you think that there are any outliers in the data set?

6.2.8 Use a statistical software package to obtain appropriate graphical presentations of each of the following data sets. Obtain more than one graphical presentation where appropriate. Indicate any data observations that might be considered to be outliers. What do your pictures tell you about the data sets?

Restaurant Service Times

The data set of service times given in DS 6.1.4.

6.3.3 **Physical Training Course Completion Times**

Consider the data set of physical training course completion times given in DS 6.2.4. Calculate the sample mean, sample median, sample trimmed mean, and sample standard deviation. Calculate the upper and lower sample quartiles, and draw a boxplot of the data set.

6.3.8 Use a statistical software package to obtain sample statistics and boxplots for the following data sets. What do the sample statistics and boxplots tell you about the data sets?

Paving Slab Weights

The data set of paving thicknesses given in DS 6.1.7

6.3.14 The sample mean is always definitely a better measure than the sample median of the "average" of a data set because it takes into account all of the data values.

A. True *B*. False