Ceng272 -Exercise Set 8

8.4 The lengths of time, in minutes, that 10 patients waited in a doctor's office before receiving treatment were recorded as follows: 5, 11, 9, 5, 10, 15, 6, 10, 5, and 10. Treating the data as a random sample, find

(a) the mean;

(b) the median;

(c) the mode.

8.9 With reference to the lengths of time that 10 patients waited in a doctor's office before receiving treatment in Exercise 8.4, find

(a) the range;

(b) the standard deviation.

8.8 Find the mean, median, and mode for the sample whose observations, 15, 7, 8, 95, 19, 12, 8, 22, and 14, represent the number of sick days claimed on 9 federal income tax returns. Which value appears to be the best measure of the center of our data? State reasons for your preference.

8.17 If all possible samples of size 16 are drawn from a normal population with mean equal to 50 and standard deviation equal to 5, what is the probability that a sample mean $\bar{X}$ will fall in the interval from $\mu_{\bar{X}} - 1.9\sigma_{\bar{X}}$ to $\mu_{\bar{X}} + 0.4\sigma_{\bar{X}}$? Assume that the sample means can be measured to any degree of accuracy.

8.20 If the standard deviation of the mean for the sampling distribution of random samples of size 36 from a large or infinite population is 2, how large must the size of the sample become if the standard deviation is to be reduced to 1.2?

8.22 The heights of 1000 students are approximately normally distributed with a mean of 174.5 centimeters and a standard deviation of 6.9 centimeters. If 200 random samples of size 25 are drawn from this population and the means recorded to the nearest tenth of a centimeter, determine

(a) the mean and standard deviation of the sampling distribution of $\bar{X}$;

(b) the number of sample means that fall between 172.5 and 175.8 centimeters inclusive;

(c) the number of sample means falling below 172.0 centimeters.

8.27 In a chemical process the amount of a certain type of impurity in the output is difficult to control and is thus a random variable. Speculation is that the population mean amount of the impurity is 0.20 grams per gram of output. It is known that the standard deviation is 0.1 grams per gram. An experiment is conducted to gain more insight regarding the speculation that $\mu = 0.2$. The process was run on a lab scale 50 times and the sample average $\bar{x}$ turned out to be 0.23 grams per gram. Comment on the speculation that the mean amount of impurity is 0.20 grams per gram. Make use of the central limit theorem in your work.