Exercise Set VII.1

1. (8.4 & 8.9) 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;
   (d) the range;
   (e) the standard deviation.
2. (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.
3. (8.17) If all possible samples of size 16 are drawn from a normal population with mean equal to 50 and standard deviationequal 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.

Exercise Set VII.2

4 (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?

5 (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.

Exercise Set VII.3

6 (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.

7 (8.43) Find the probability that a random sample of 25 observations, from a normal population with variance $\sigma^2 = 6$, will have a variance s^2

(a) greater than 9.1;;
(b) between 3.462 and 10.745.

Assume the sample variances to be continuous measurements

Exercise Set VII.4

8 (8.51) A normal population with unknown variance has a mean of 20. Is one likely to obtain a random sample of size 9 from this population with a mean of 24 and a standard deviation of 4.1? If not, what conclusion would you draw?

9 (8.55) Consider the following measurements of the heat producing capacity of the coal produced by two mines (in millions of calories per ton):

Table: Data for Exercise Set VII.9.

Mine 1:	8260	8130	8350	8070	8340	-
Mine 2:	7950	7890	7900	8140	7920	7840

Can it be concluded that the two population variances are equal?