2. (Page 361, problem 2 modified) The manager of a shipping department of a mail-order operation located in Helsinki has been receiving complaints about the length of time it takes for customers in Utsjoki to receive their orders. To learn more about this potential problem, the manager chose a random sample of 12 orders and then checked to see how many days it took to receive each of these orders. The resulting data were 15, 20, 10, 11, 7, 12, 9, 14, 12, 8, 13, 16.

   Find a 90 percent confidence interval estimate for the mean time it takes customers in Utsjoki to receive their orders when

   (a) the population standard deviation is known to be 3.7 days.

   (b) the population standard deviation is unknown

To receive full points from problems 3–5 your solution needs to clearly contain the hypotheses and conclusion of the test with justifications. So make sure to write these clearly in your solution.

3. (Page 394, problem 8) When a certain production process is operating properly, it produces items that each have a measurable characteristic with mean 122 and standard deviation 9. However, occasionally the process goes out of control, and this results in a change in the mean of the items produced. Test the hypothesis that the process is presently in control if a random sample of 10 recently produced items had the following values:

   123, 120, 115, 125, 131, 127, 130, 118, 125, 128

   Specify the null and alternative hypotheses, and find the p value.

4. (Page 411, problem 12) A recently published study claimed that the average academic year salary of full professors at colleges and universities in the United States is $87,800. Students at a certain private school guess that the average salary of their professors is higher than this figure and so have decided to test the null hypothesis

$$H0 : \mu \leq 87,800 \text{ against } H1 : \mu > 87,800$$

where μ is the average salary of full professors at their school. A random sample of 10 professors elicited the following salaries (in units of $1000):

91.0 79.8 102.0 93.5 82.0 88.6 90.0 98.6 101.0 84.0

(a) Is the null hypothesis rejected at the 10 percent level of significance?

(b) What about at the 5 percent level?

(a) Is the null hypothesis rejected at the 10 percent level of significance?

(b) What about at the 5 percent level?

5. (Page 422, problem 8) An ambulance service claims that at least 45 percent of its calls involve life-threatening emergencies. To check this claim, a random sample of 200 calls was selected from the service's files. If 70 of these calls involved life-threatening emergencies, is the service's claim believable

(a) at the 5 percent

(b) at the 1 percent

level of significance? Use normal approximation.