8.1.8 An experimenter would like to construct a 99% two-sided t-interval, with a length at most 0.2 ohms, for the average resistance of a segment of copper cable of a certain length. If the experimenter feels that the standard deviation of such resistances is no larger than 0.15 ohms, what sample size would you recommend?

8.1.10 Consider the sample of 41 glass sheets discussed in Problem 8.1.2. How many additional glass sheets should be sampled to construct a 99% two-sided t-interval for the average sheet thickness with a length no larger than $L0 = 0.05mm$?

8.1.2 **Supplementary problem for 8.1.10**

A random sample of 41 glass sheets is obtained and their thicknesses are measured. The sample mean is $\overline{x} = 3.04$ mm and the sample standard deviation is $s = 0.124$ mm. Construct a 99% two-sided t-interval for the mean glass thickness.

8.1.14 A sample of 19 data observations has a sample mean of $\bar{x} = 11.80$. If an experimenter wishes to use a "known" value $\sigma = 2.0$ for the population standard deviation, find the value of c for which $\mu \in (c, \infty)$ is a one-sided 95% confidence interval for the population mean μ.

8.1.16 The pH levels of a random sample of 16 chemical mixtures from a process were measured, and a sample mean $\overline{x} = 6.861$ and a sample standard deviation $s = 0.440$ were obtained. The scientists presented a confidence interval (6.668, 7.054) for the average pH level of chemical mixtures from the process. What is the confidence level of this confidence interval?

8.2.4 A sample of $n = 44$ observations has a sample mean of $\bar{x} = 87.90$. If an assumed known standard deviation of $\sigma = 5.90$ is used, calculate the p-values for the hypothesis testing problems:

(a) $H_0 : \mu = 90.0$ versus $H_A : \mu \neq 90.0$

(b) $H_0 : \mu \leq 86.0$ versus $H_A : \mu > 86.0$

8.2.10 An experimenter is interested in the hypothesis testing problem

$$H_0 : \mu \geq 420.0 \quad \text{versus} \quad H_A : \mu < 420.0$$

where μ is the average radiation level in a research laboratory. Suppose that a sample of $n = 29$ radiation level measurements is obtained and that the experimenter wishes to use a value of $\sigma = 10.0$ for the standard deviation of the radiation levels.

(a) For what values of the z-statistic does the experimenter *accept* the null hypothesis with a size α =0.10?

(b) For what values of the z-statistic does the experimenter *reject* the null hypothesis with a size $\alpha = 0.01$?

Suppose that the sample mean is $\bar{x} = 415.7$.

(a) Is the null hypothesis accepted or rejected with $\alpha = 0.10$? With $\alpha = 0.01$?

(b) Calculate the exact p-value.

8.2.18 **Paving Slab Weights**

Consider the data set of paving slab weights given in DS 6.1.7. The slabs are supposed to have an average weight of 1.1 kg. Is there any evidence that the manufacturing process needs adjusting? (With $\alpha = 0.05$.)

8.2.24 A random sample of 25 components is obtained, and their weights are measured. The sample mean is 71.97 g and the sample standard deviation is 7.44 g. Conduct a hypothesis test to assess whether there is sufficient evidence to establish that the components have an average weight larger than 70 g.