4. In a survey of 1023 high school students, 102 chose education for their career choice (based on results from a KeyStat Marketing survey). Find the critical value that would be used for constructing a 90% confidence interval estimate of the population proportion.

5. Find the sample size required to estimate the percentage of college students who own a car. Assume that we want 90% confidence that the proportion from the sample is within three percentage points of the true population percentage.

6. Find the sample size required to estimate the mean IQ of students currently taking a statistics course. Assume that we want 99% confidence that the mean from the sample is within two IQ points of the true population mean. Also assume that $\sigma = 15$.

7. Six human skulls from around 4000 B.C. were measured, and the lengths have a mean of 94.2 mm and a standard deviation of 4.9 mm. If you want to construct a 95% confidence interval estimate of the mean length of all such skulls, what requirements must be satisfied?

8. In general, what does "degrees of freedom" refer to? For the sample data described in Exercise 7, find the number of degrees of freedom, assuming that you want to construct a confidence interval estimate of μ.

9. Refer to Exercise 7 and assume that the requirements are satisfied. Find the critical value that would be used for constructing a 95% confidence interval estimate of μ.

10. Refer to Exercise 7 and assume that the requirements are satisfied. Find the critical values that would be used to construct a 95% confidence interval estimate of σ.

Review Exercises

1. Overpaid In a Gallup poll of 557 randomly selected adults, 284 said that they were underpaid.

a. Identify the best point estimate of the *percentage* of all adults who say that they are underpaid.

b. Construct a 95% confidence interval estimate of the *percentage* of all adults who say that they are underpaid.

c. Can we safely conclude that the majority of adults say that they are underpaid?

2. Lefties The author had difficulty finding the percentage of people who write with their left hand. If we want to estimate that percentage based on survey results, how many people must we survey in order to be 99% confident that we are within two percentage points of the population percentage? Assume that we know nothing about the percentage of the population that writes with the left hand.

3. Lefties Yet Again There have been several studies conducted in an attempt to identify ways in which left-handed people are different from those who are right handed. Assume that you want to estimate the mean IQ of all left-handed adults. How many random left-handed adults must be tested in order to be 98% confident that the mean IQ of the sample group is within three IQ points of the mean IQ of all left-handed adults? Assume that σ is known to be 16.

4. Distributions Identify the distribution (normal, Student t, chi-square) that applies to each of the following situations. (If none of the three distributions is appropriate, then so state.)

a. In constructing a confidence interval of μ, you have 50 sample values and they appear to be from a population with a skewed distribution. The population standard deviation is not known.