Cumulative Review Exercises

Please be aware that some of the following problems may require knowledge of concepts presented in previous chapters.

1. Dictionary Words A simple random sample of pages from *Merriam-Webster's Collegiate Dictionary,* 11th edition, is obtained. Listed below are the numbers of words defined on those pages. Find the values of the indicated statistics.

51 63 36 43 34 62 73 39 53 79

a. Mean **b.** Median **c.** Standard deviation **d.** Variance **e.** Range

2. Dictionary Words Refer to the sample data in Exercise 1.

a. What is the level of measurement of the data (nominal, ordinal, interval, ratio)?

b. Are the values discrete or continuous?

c. What does it mean to state that the sample is a simple random sample?

3. Confidence Interval for Dictionary Words Use the sample values given in Exercise 1 to construct a 95% confidence interval estimate of the population mean. Assume that the population has a normal distribution.

4. Hypothesis Test for Dictionary Words Refer to the sample data given in Exercise 1. Given that the dictionary has 1459 pages with defined words, the claim that there are more than 70,000 defined words is the same as the claim that the mean number of defined words on a page is greater than 48.0. Use a 0.05 significance level to test the claim that the mean number of defined words on a page is greater than 48.0. What does the result suggest about the claim that there are more than 70,000 defined words in the dictionary?

5. Designing Cars The sitting height (from seat to top of head) of drivers must be considered in the design of a new car model. Men have sitting heights that are normally distributed with a mean of 36.0 in. and a standard deviation of 1.4 in. (based on anthropometric survey data from Gordon, Churchill, et al.).

a. One car is designed to accommodate sitting heights of 38.8 in. or less. Find the percentage of men with sitting heights greater than 38.8 in.

b. If the sitting height is to be changed so that 98% of men will be accommodated, what is the new sitting height?

c. If a car is occupied by four men, find the probability that they have a mean sitting height less than 37.0 in.

6. Left-Handedness Among Americans, 9.7% of males are left-handed and 12.5% of females are left-handed.

a. If three females are randomly selected, find the probability that they are all left-handed. When randomly selecting three females, is it unlikely that all of them are left-handed? Why or why not?

b. If one male is randomly selected and one female is randomly selected, find the probability that they are both left-handed.

c. If five females are randomly selected, find the probability that at least one of them is left-handed.

7. Normal Rainfall The following histogram is obtained from the daily rainfall amounts (in.) in Boston for a year. If we want to conduct a hypothesis test of a claim about the mean, there is a requirement that the population of rainfall amounts must have a normal distribution.