b. Table 6-3 describes the sampling distribution of the sample mean. Construct a similar table representing the sampling distribution of the sample standard deviation s. Then combine values of s that are the same, as in Table 6-4. (*Hint:* See Example 1 for Tables 6-3 and 6-4 that describe the sampling distribution of the sample mean.)

c. Find the mean of the sampling distribution of the sample standard deviation.

d. Based on the preceding results, is the sample standard deviation an unbiased estimator of the population standard deviation? Why or why not?

9. Sampling Distribution of the Sample Median

a. Find the value of the population median.

b. Table 6-3 describes the sampling distribution of the sample mean. Construct a similar table representing the sampling distribution of the sample median. Then combine values of the median that are the same, as in Table 6-4. (*Hint:* See Example 1 for Tables 6-3 and 6-4 that describe the sampling distribution of the sample mean.)

c. Find the mean of the sampling distribution of the sample median.

d. Based on the preceding results, is the sample median an unbiased estimator of the population median? Why or why not?

10. Sampling Distribution of the Sample Proportion

a. For the population, find the proportion of odd numbers.

b. Table 6-3 describes the sampling distribution of the sample mean. Construct a similar table representing the sampling distribution of the sample proportion of odd numbers. Then combine values of the sample proportion that are the same, as in Table 6-4. (*Hint:* See Example 1 for Tables 6-3 and 6-4 that describe the sampling distribution of the sample mean.)

c. Find the mean of the sampling distribution of the sample proportion of odd numbers.

d. Based on the preceding results, is the sample proportion an unbiased estimator of the population proportion? Why or why not?

In Exercises 11–14, use the population of ages {56, 49, 58, 46} of the four U.S. presidents (Lincoln, Garfield, McKinley, Kennedy) when they were assassinated in office. Assume that random samples of size $n = 2$ are selected with replacement.

11. Sampling Distribution of the Sample Mean

a. After identifying the 16 different possible samples, find the mean of each sample, then construct a table representing the sampling distribution of the sample mean. In the table, combine values of the sample mean that are the same. (*Hint:* See Table 6-4 in Example 1.)

b. Compare the mean of the population {56, 49, 58, 46} to the mean of the sampling distribution of the sample mean.

c. Do the sample means target the value of the population mean? In general, do sample means make good estimators of population means? Why or why not?

12. Sampling Distribution of the Median Repeat Exercise 11using medians instead of means.

13. Sampling Distribution of the Range Repeat Exercise 11 using ranges instead of means.

14. Sampling Distribution of the Variance Repeat Exercise 11 using variances instead of means.