7-1 Review and Preview

In Chapters 2 and 3 we used *descriptive statistics* when we summarized data using tools such as graphs and statistics such as the mean and standard deviation. This and following chapters present methods of *inferential statistics* that involve the use of sample data to form generalizations or inferences about a population. See the following two major activities.

Major Activities of Inferential Statistics

1. Use sample data to estimate values of population parameters (such as a population proportion or population mean).
2. Test hypotheses (or claims) made about population parameters.

In this chapter we begin working with the true core of inferential statistics as we use sample data to estimate values of population parameters. For example, the Chapter Problem refers to a survey of 1007 adults, and we see that 85% of them know what Twitter is. Based on the sample statistic of 85%, we will estimate the percentage of *all* U.S. adults who know what Twitter is. In so doing, we are using sample results to make an inference about the population.

This chapter focuses on the use of sample data to estimate a population parameter, and Chapter 8 will introduce the basic methods for testing claims (or hypotheses) that have been made about a population parameter.

Brief Review Because Sections 7-2 and 7-3 use *critical values,* it is helpful to review this notation introduced in Section 6-2: z_α denotes the z score with an area of α to its right. (α is the Greek letter alpha.) See Example 8 in Section 6-2, where it is shown that if $\alpha = 0.025$, the critical value is $z_{0.025} = 1.96$. That is, for the standard normal distribution, the critical value of $z_{0.025} = 1.96$ has an area of 0.025 to its right.

7-2 Estimating a Population Proportion

Key Concept This section presents methods for using a sample proportion to make an inference about the value of the corresponding population proportion. Here are the three main concepts included in this section:

- **Point Estimate:** The sample proportion (denoted by $\hat{p}$) is the best *point estimate* (or single value estimate) of the population proportion p.
- **Confidence Interval:** We can use a sample proportion to construct a *confidence interval* estimate of the true value of a population proportion, and we should know how to construct and interpret such confidence intervals.
- **Sample Size:** We should know how to find the sample size necessary to estimate a population proportion.

The concepts presented in this section are used in the following sections and chapters, so it is important to understand this section quite well.

Proportion, Probability, and Percent Although this section focuses on the population proportion p, we can also work with probabilities or percentages. When working with percentages, we will perform calculations with the equivalent proportion value.