

39. Change for a Quarter How many different ways can you make change for a quarter? (Different arrangements of the same coins are not counted separately.)

40. Oldie but Goodie A secretary types 10 different letters and addresses 10 corresponding envelopes. If he is in a hurry and randomly inserts the letters into the envelopes, what is the probability that exactly 9 of the letters are in the correct envelopes? (Based on *Mathematics Magazine*, Vol. 23, No. 4, 1950)

4-7

Probabilities Through Simulations (on CD-ROM)

The CD-ROM included with this book includes another section that discusses the use of simulation methods for finding probabilities. Simulations are also discussed in the Technology Project near the end of this chapter.

4-8

Bayes' Theorem (on CD-ROM)

The CD-ROM included with this book includes another section dealing with conditional probability. This additional section discusses applications of *Bayes' theorem* (or *Bayes' rule*), which we use for revising a probability value based on additional information that is later obtained. See the CD-ROM for the discussion, examples, and exercises describing applications of Bayes' theorem.

Chapter 4 Review

The single most important concept presented in this chapter is the *rare event rule for inferential statistics*, because it forms the basis for *hypothesis testing* introduced in Chapter 8.

Rare Event Rule for Inferential Statistics

If, under a given assumption, the probability of a particular observed event is extremely small, we conclude that the assumption is probably not correct.

In Section 4-2 we presented the basic definitions and notation associated with probability. We should know that a probability value, which is expressed as a number between 0 and 1, reflects the likelihood of some event. We introduced the following important principles and notation.

Important Principles and Notation for Probability

- The probability of an event is a fraction or decimal number between 0 and 1 inclusive.
- The probability of an impossible event is 0.
- The probability of an event that is certain to occur is 1.
- Notation: The probability of event A is denoted by $P(A)$.
- Notation: The probability that event A does *not* occur is denoted by $P(\bar{A})$.