they do provide a strong foundation for the most common rules that can be used in a wide variety of real applications.

4-6 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Notation What does the symbol ! represent? Four different people can stand in a line 4! different ways. What is the actual number of ways that four people can stand in a line?

2. California Fantasy The winning numbers for the current California Fantasy 5 lottery are 13, 18, 22, 24, and 32 in any order. Do calculations for winning this lottery involve permutations or combinations? Why?

3. California Daily 4 The winning numbers for the current California Daily 4 lottery are 5, 0, 0, and 4 in that exact order. Because order counts, do calculations for this lottery involve either of the two permutation rules presented in this section? Why or why not? If not, what rule does apply?

4. Selections with Replacement When randomly selecting items, if successive selections are made *with replacement* of previously selected items, which of the five rules of this section apply: (1) fundamental couting rule; (2) factorial rule; (3) permutations rule (when all items are different); (4) permutations rule (when some items are identical to others); (5) combinations rule?

In Exercises 5–36, express all probabilities as fractions.

5. ATM Pin Numbers A thief steals an ATM card and must randomly guess the correct pin code that consists of four digits (0 through 9) that must be entered in the correct order. Repetition of digits is allowed. What is the probability of a correct guess on the first try?

6. Social Security Numbers A Social Security number consists of nine digits in a particular order, and repetition of digits is allowed. If randomly selecting digits for one Social Security number, what is the probability that you get the Social Security number of the president?

7. Baseball Batting Order If you know the names of the starting batters for a baseball team, what is the probability of randomly selecting a batting order and getting the order that is used in the beginning of the game?

8. Harry Potter Books There are seven books in the Harry Potter series. If the books are read in a randomly selected order, what is the probability that they are read in the order that they were written?

9. Lady Antebellum Songs A fan of Lady Antebellum music plans to make a custom CD with 12 of her 27 songs. How many different combinations of 12 songs are possible? Is it practical to make a different CD for each possible combination?

10. Blackjack In the game of blackjack played with one deck, a player is initially dealt 2 different cards from the 52 different cards in the deck. Find the probability of getting a 2-card initial hand consisting of the ace of clubs and the ace of spades in any order.

11. Scheduling Routes A presidential candidate plans to begin her campaign by visiting the capitals in 4 of the 50 states. What is the probability that she selects the route of Sacramento, Albany, Juneau, and Hartford? Is it practical to list all of the different possible routes in order to select the one that is best?

12. FedEx Deliveries With a short time remaining in the day, a FedEx driver has time to make deliveries at three locations among the eight locations remaining. How many different routes are possible?