4-5 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Subjective Probability

a. Estimate the probability that on the next test in a randomly selected statistics class, at least one student earns a grade of A.

b. Answer part (a) with the additional knowledge that the selected class is a special section for honors students with very high grade point averages.

2. Conditional Probability What is a conditional probability?

3. Notation Let event A = subject is telling the truth and event B = polygraph test indicates that the subject is lying. Use your own words to translate the notation $P(B|A)$ into a verbal statement.

4. Confusion of the Inverse Using the same events A and B described in Exercise 3, what is confusion of the inverse? (Express the answer in both words and symbols.)

Describing Complements.   *In Exercises 5–8, provide a written description of the complement of the given event, then find the probability of the complement of the given event.*

5. Five Girls When a couple has five children, all five are girls. (Assume that boys and girls are equally likely.)

6. No Girls When a couple has five children, none of the five is a girl. (Assume that boys and girls are equally likely.)

7. At Least One Zero When four digits (between 0 and 9 inclusive) are randomly selected with replacement for a lottery ticket, at least one of the digits is 0.

8. No 7s When four digits (between 0 and 9 inclusive) are randomly selected with replacement for a lottery ticket, none of the digits is a 7.

9. At Least One Correct Answer If you make random guesses for 10 multiple-choice test questions (each with five possible answers), what is the probability of getting at least 1 correct? If a very lenient instructor says that passing the test occurs if there is at least one correct answer, can you reasonably expect to pass by guessing?

10. At Least One Working Calculator A statistics student plans to use a TI-84 Plus calculator on her final exam. From past experience, she estimates that there is 0.92 probability that the calculator will work on any given day. Because the final exam is so important, she plans to use redundancy by bringing in two TI-84 Plus calculators. What is the probability that she will be able to complete her exam with a working calculator? Does she really gain much by bringing in the backup calculator? Explain.

11. Probability of a Girl Assuming that boys and girls are equally likely, find the probability of a couple having at least one boy after their fifth child is born, given that the first four children were all girls.

12. At Least One Correct Answer If you make random guesses for 10 multiple-choice test questions (each with five possible answers), what is the probability of getting at least one answer correct, given that the first nine answers are all wrong?

13. Births in the United States In the United States, the true probability of a baby being a boy is 0.512 (based on the data available at this writing). Among the next five randomly selected births in the United States, what is the probability that at least one of them is a girl?