

## Cooperative Group Activities

**1. Out-of-class activity** Divide into groups of four or five students. The instructions for Exercises 21–24 in Section 11-2 noted that according to Benford's law, a variety of different data sets include numbers with leading (first) digits that follow the distribution shown in the table below. Collect original data and use the methods of Section 11-2 to support or refute the claim that the data conform reasonably well to Benford's law. Here are some possibilities: (1) leading digits of amounts on the checks that you wrote; (2) leading digits of the prices of stocks; (3) leading digits of the numbers on street addresses; (5) leading digits of the lengths of rivers in the world.

Leading Digit	1	2	3	4	5	6	7	8	9
Benford's Law	30.1%	17.6%	12.5%	9.7%	7.9%	6.7%	5.8%	5.1%	4.6%

**2. Out-of-class activity** Divide into groups of four or five students and collect past results from a state lottery. Such results are often available on web sites for individual state lotteries. Use the methods of Section 11-2 to test that the numbers are selected in such a way that all possible outcomes are equally likely.

**3. Out-of-class activity** Divide into groups of four or five students. Each group member should survey at least 15 male students and 15 female students at the same college by asking two questions: (1) Which political party does the subject favor most? (2) If the subject were to make up an absence excuse of a flat tire, which tire would he or she say went flat if the instructor asked? (See Exercise 8 in Section 11-2.) Ask the subject to write the two responses on an index card, and also record the gender of the subject and whether the subject wrote with the right or left hand. Use the methods of this chapter to analyze the data collected. Include these claims:

- The four possible choices for a flat tire are selected with equal frequency.
- The tire identified as being flat is independent of the gender of the subject.
- Political party choice is independent of the gender of the subject.
- Political party choice is independent of whether the subject is right- or left-handed.
- The tire identified as being flat is independent of whether the subject is right- or left-handed.
- Gender is independent of whether the subject is right- or left-handed.
- Political party choice is independent of the tire identified as being flat.

**4. Out-of-class activity** Divide into groups of four or five students. Each group member should select about 15 other students and first ask them to “randomly” select four digits each. After the four digits have been recorded, ask each subject to write the last four digits of his or her Social Security number. Take the “random” sample results and mix them into one big sample, then mix the Social Security digits into a second big sample. Using the “random” sample set, test the claim that students select digits randomly. Then use the Social Security digits to test the claim that they come from a population of random digits. Compare the results. Does it appear that students can randomly select digits? Are they likely to select any digits more often than others? Are they likely to select any digits less often than others? Do the last digits of Social Security numbers appear to be randomly selected?

**5. In-class activity** Divide into groups of three or four students. Each group should be given a die along with the instruction that it should be tested for “fairness.” Is the die fair or is it biased? Describe the analysis and results.