

**Practice Level B**

**1.** random sample; unbiased; The sample is representative of the population (car owners).

**2.** convenience sample; biased; Consumers shopping on a Friday probably prefer to shop on that day. **3.** systematic; biased; Students in the math club are more likely to prefer math than other students.

**4.**  $\pm 7.1\%$  **5.**  $\pm 5.3\%$  **6.**  $\pm 3.0\%$  **7.**  $\pm 2.0\%$

**8.**  $\pm 1.4\%$  **9.**  $\pm 4.5\%$  **10.**  $\pm 6.0\%$  **11.**  $\pm 1.1\%$

**12.** 2500 **13.** 625 **14.** 111 **15.** 1372 **16.** 494

**17.** 40,000 **18.** 772 **19.** 178 **20.** 4.5%

**21.** between 6.5% and 15.5% **22.** 750 **23.** 3.7%

**24.** between 64.3% and 71.7% **25.** 1600

**Practice B**

**1.** This question may be biased because the respondent is encouraged to respond in a particular way, suggesting that replacing the auditorium chairs is a good thing to do. A better question is "Do you think the chairs in the auditorium need to be replaced?"

**2.** This question assumes that the respondent is familiar with the mayor's tax plan. To get accurate results that lead to valid conclusions, state the tax proposal clearly using neutral language before asking the question. **3.** The survey question is not biased, but students may be afraid to admit to a fireman that they do not have enough smoke detectors. One improvement might be to have students fill out a fire-safety survey on paper.

**4.** Experiment; the painter applies a treatment (paint additive) to some individuals (walls).

**5.** Observational study; The veterinarian gathers data without controlling the individuals or imposing a treatment. **6.** The study is a randomized comparative experiment; the treatment is using disc wheels, the treatment group is the cyclists who used disc wheels, and the control group is the cyclists who used spoked wheels. **7.** Experiment; randomly choose a treatment group of students in your math class who can use calculators while doing their homework and randomly choose a control group of students in your math class who cannot use calculators while doing the same homework. Monitor the time it takes for individuals in each group to complete their homework. To control for group differences, you could then switch the calculator and non-calculator groups on another assignment at the same level of dif-

ficulty. **8.** Observational study; randomly choose grocery stores in the city and randomly choose grocery stores in suburbs of the city. Monitor the prices of identical or comparable items at stores in both groups. **9.** The treatment is applying an anti-reflective coat to eyeglasses. Randomly choose a treatment group of people who wear eyeglasses to undergo the treatment and randomly choose a control group of people who wear eyeglasses. Make sure that the individuals in the control group do not wear glasses that have already been treated with an anti-reflective coating. Test the vision of individuals in both groups in glare-causing situations. The tests for each group should be the same.