8.3: (a) The population is all 45,000 people who made credit card purchases. (b) The sample is the 137 people who returned the survey form.

8.5: Because all the students surveyed are enrolled in a special senior honors class, these students may be more likely to be interested in joining the club (and more willing to pay $35 to do so). The direction of bias is likely to overestimate the proportion of all psychology majors willing to pay to join this club. This is a convenience sample.

8.7: Number from 01 to 26 alphabetically (down the columns). With the applet: Population = 1 to 26, select a sample of size 5, then click Reset and Sample. With Table B, enter at line 134 and choose 16 = Ippolito, 18 = Jung, 13 = Gupta, 21 = Modur, and 04 = Bonds.

8.11: The higher non-answer was probably the second period—more families are likely to be gone for vacations, or to be outside enjoying the warmer weather, and so on. Nonresponse of this type might underrepresent those who are more affluent (and are able to travel). In general, high nonresponse rates always make results less reliable, because we do not know what information we are missing.

8.13: (a) all customers who have purchased something in the last year.

8.14: (b) the 152 voters returning the questionnaire.

8.15: (b) the poll uses voluntary response, so the results tell us little about the population of interest.

8.16: (a) 001, 002, 003, ..., 439, 440. Each member of the population needs a 3-digit label, and we need 440 of them (not 441, as in (b)).

8.17: (c) 04, 18, 07, 13, 02, 05. (Notice that in (b) “07” appears in the sample twice.)

8.18: (b) undercoverage.

8.19: (b) The result for the entire sample is more accurate because both come from the same sample.
8.21: The population is the 1000 envelopes stuffed during a given hour. The sample is the 40 envelopes selected.

8.23: With the applet: Population = 1 to 287, select a sample of size 20, then click Reset and Sample. Using Table B, number the area codes 001 to 287. Then, enter at line 135, and pay attention to the instructions that if we use the table, we'll pick only 5 numbers. The selected area codes are 255, 100, 120, 126, 008.

8.27: (a) False. Such regularity holds only in the long run. If it were true, you could look at the first 39 digits and know whether or not the 40th digit was a 0. (b) True. All pairs of digits (there are 100, from 00 to 99) are equally likely. (c) False. Four random digits have chance 1/10,000 to be 0000, so this sequence will occasionally occur. The sequence 0000 is no more or less random than 1234 or 2718, or any other four-digit sequence.

8.28: (a) The population is (something like) adult residents of the United States. (b) The nonresponse rate is \( \frac{1169}{2000} = 58.45\% \). (c) This question will likely have response bias; specifically, many people will give an inaccurate count of how many movies they have seen in the past year.

8.30: The response rate was \( \frac{5029}{45,956} = 0.1094 \), so the nonresponse rate was \( 0.8906 = 89.1\% \).

8.33: (a) Each person has a 10\% chance: 4 of 40 men, and 3 of 30 women. (b) This is not an SRS because not every group of 7 people can be chosen; the only possible samples are those with 4 men and 3 women.
8.36: (a) Because \( 200/5 = 40 \), we will choose one of the first 40 names at random. Beginning on line 120, the addresses selected are 35, 75, 115, 155, and 195. (Only the first number is chosen from the table.) (b) All addresses are equally likely: each has chance \( 1/40 \) of being selected. To see this, note that each of the first 40 has chance \( 1/40 \) because one is chosen at random. But each address in the second 40 is chosen exactly when the corresponding address in the first 40 is, so each of the second 40 also has chance \( 1/40 \). And so on. This is not an SRS because the only possible samples have exactly one address from the first 40, one address from the second 40, and so on. An SRS could contain any 5 of the 200 addresses in the population. Note that this view of systematic sampling assumes that the number in the population is a multiple of the sample size.

8.39: (a) The wording is clear, but will almost certainly be slanted toward a high positive response. (Would anyone hear the phrase “brain cancer” and not be inclined to agree that a warning label is a good idea?) (b) The question makes the case for a national health care system, and so will slant responses toward “yes.” (c) This survey question is most likely to produce a response similar to: “Uhh...yes? I mean, no? I’m sorry, could you repeat the question?” (And, if the person is able to understand the question, it is slanted in favor of day-care subsidies.)