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5.9 CHOOSE YOUR SAMPLE   You must choose an SRS of 10 of the 440 retail outlets in New York, that sell your company's products. How would you label this population? Use Table B, starting at line 105, to choose your sample.

Labeling from 001 to 440, we select 400, 077, 172, 417, 350, 131, 211, 273, 208, and 074.

5.10 WHO SHOULD BE INTERVIEWED   A firm wants to understand the attitudes of its minority managers toward its system for assessing management performance. Below is a list of all the firm's managers who are members of minority groups. Use Table B at line 139 to choose 6 to be interviewed in detail about the performance appraisal system.

Agarwal	Gates	Peters
Anderson	Goel	Pliego
Baxter	Gomez	Puri
Bonds	Hernandez	Richards
Bowman	Huang	Rodriguez
Castillo	Kim	Santiago
Cross	Liao	Shen
Dewald	Mourning	Vega
Fernandez	Naber	Wang
Fleming		

Starting with 01 and numbering down the columns, one chooses
04-Bonds, 10-Fleming, 17 -Liao, 19-Naber, 12-Goel, and 13-Gomez.

5.13 SAMPLING FRAME   The list of individuals from which a sample is actually selected is called the *sampling frame.* Ideally, the frame should list every individual in the population, but in practice this is often difficult. A frame that leaves out part of the population is a common source of undercoverage.

(a) Suppose that a sample of households in a community is selected at random from the telephone directory. What households are omitted from this frame? What types of people do you think are likely to live in these households? These people will probably be underrepresented in the sample.

Households without telephones, or with unlisted numbers. Such households would likely be made up of poor individuals (who cannot afford a phone), those who choose not to have phones, and those who do not wish to have their phone number published.

(b) It is more common in telephone surveys to use random digit dialing equipment that selects the last four digits of a telephone number at random after being given the exchange (the first three digits). Which of the households you mentioned in your answer to (a) will be included in the sampling frame by random digit dialing?   Those with unlisted numbers would be included in the sampling frame when a random digit dialer is used.

5.14 **RING-NO-ANSWER** A common form of nonresponse in telephone surveys is "ring-no-answer." That is, a call is made to an active number but no one answers. The Italian National Statistical Institute looked at nonresponse to a government survey of households in Italy during the periods January 1 to Easter and July 1 to August 31. All calls were made between 7 and 10 p.m., but 21.4% gave "ring-no-answer" in one period versus 41.5% "ring-no-answer" in the other period. Which period do you think had the higher rate of no answers? Why? Explain why a high rate of nonresponse makes sample results less reliable.

> The higher no-answer was probably the second period—more families are likely to be gone for vacations, etc. Nonresponse of this type might underrepresent those who are more affluent (and are able to travel).

5.15 **QUESTION WORDING** During the 2000 presidential campaign, the candidates debated what to do with the large government surplus. The Pew Research Center asked two questions of random samples of adults. Both questions stated that social security would be "fixed." Here are the uses suggested for the remaining surplus:

> *Should the money be used for a tax cut, or should it be used to fund new government programs?*

> *Should the money be used for a tax cut, or should it be spent on programs for education, the environment, health care, crime-fighting and military defense?*

One of the questions drew 60% favoring a tax cut; the other, only 22%. Which wording pulls respondents toward a tax cut? Why?

> The first wording would pull respondents toward a tax cut because the second wording mentions several popular alternative uses for tax money.

HW #31 17, 18, 21, 24, 26, 27, 30

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5.17 **EQUAL PAY FOR MALE AND FEMALE ATHLETES?** The Excite Poll can be found online at http://lite.excite.com. The question appears on the screen, and you simply click buttons to vote "Yes," "No," or "Not Sure." On January 25, 2000, the question was "Should female athletes be paid the same as men for the work they do?" In all, 13,147 (44%) said "Yes," another 15,182 (50%) said "No," and the remaining 1448 said "Not Sure."

(a) What is the sample size for this poll?   13,147 + 15,182 + 1448 = 29,777.

(b) That's a much larger sample than standard sample surveys. In spite of this, we can't trust the result to give good information about any clearly defined population. Why?

> There's nothing to prevent a person from answering several times. Also, the respondents were only those who went to that Web site and took the time to respond. We cannot define "nonresponse" in this situation.

(c) More men than women use the Web. How might this affect the poll results?

> The results are slanted toward the opinions of men, who might be less likely to feel that female athletes should earn as much as men.

5.18 **WORDING BIAS** Comment on each of the following as a potential sample survey question. Is the question clear? Is it slanted toward a desired response?

(a) "Some cell phone users have developed brain cancer. Should all cell phones come with a warning label explaining the danger of using cell phones?"
    The wording is clear. The question is somewhat slanted in favor of warning labels.

(b) "Do you agree that a national system of health insurance should be favored because it would provide health insurance for everyone and would reduce administrative costs?"
    The question is clear, but it is clearly slanted in favor of national health insurance by asserting it would reduce administrative costs.

(c) "In view of escalating environmental degradation and incipient resource depletion, would you favor economic incentives for recycling of resource-intensive consumer goods?"
    The question could be clearer by using simpler language. It is slanted in favor of incentives by starting out discussing environmental degradation.

5.21 **TESTING CHEMICALS** A manufacturer of chemicals chooses 3 from each lot of 25 containers of a reagent to test for purity and potency. Below are control numbers stamped on the bottles in the current lot. Use Table B at line 111 to choose an SRS of 3 of these bottles.

A1096	A1097	A1098	A1101	A1108
A1112	A1113	A1117	A2109	A2211
A2220	B0986	B1011	B1096	B1101
B1102	B1103	B1110	B1119	B1137
B1189	B1223	B1277	B1286	B1299

Number the bottles across the rows from 01 to 25, then select 12 – B0986, 04 – A1101, and
    11 – A2220.
(If numbering is done down columns instead, the sample will be A1117, B1102, and A1098.)

5.24 **RANDOM DIGITS** Which of the following statements are true of a table of random digits, and which are false? Briefly explain your answers.

(a) There are exactly four 0s in each row of 40 digits.
    False—if it were true, then after looking at 39 digits, we would know whether or not the 40th digit was a 0, contrary to property 2.

(b) Each pair of digits has chance 1/100 of being 00.
    True—there are 100 pairs of digits 00 through 99, and all are equally likely.

(c) The digits 0000 can never appear as a group, because this pattern is not random.
    False—0000 is just as likely as any other string of four digits.

5.26 **CHECKING FOR BIAS** Comment on each of the following as a potential sample survey question. Is the question clear? Is it slanted toward a desired response?

(a) Which of the following best represents your opinion on gun control?

    1. The government should confiscate our guns.

    2. We have the right to keep and bear arms.

This question will likely elicit more responses against gun control (that is, more people will choose 2). The two options presented are too extreme; no middle position on gun control is allowed.

(b) A freeze in nuclear weapons should be favored because it would begin a much needed process to stop everyone in the world from building nuclear weapons now and reduce the possibility of nuclear war in the future. Do you agree or disagree? The phrasing of this question will tend to make people respond in favor of a nuclear freeze. Only one side of the issue is presented.

(c) In view of escalating environmental degradation and incipient resource depletion, would you favor economic incentives for recycling of resource-intensive consumer goods? The wording is too technical for many people to understand—and for those that do understand it, it is slanted because it suggests reasons why one should support recycling. It could be rewritten to something like: "Do you support economic incentives to promote recycling?"

5.27 **SAMPLING ERROR** A *New York Times* opinion poll on women's issues contacted a sample of 1025 women and 472 men by randomly selecting telephone numbers. The *Times* publishes complete descriptions of its polling methods. Here is part of the description for this poll:

> *In theory, in 19 cases out of 20 the results based on the entire sample will differ by no more than three percentage points in either direction from what would have been obtained by seeking out all adult Americans.*
> *The potential sampling error for smaller subgroups is larger. For example, for men it is plus or minus 5 percentage points.*

Explain why the margin of error is larger for conclusions about men alone than for conclusions about all adults.
A smaller sample gives less information about the population. "Men" constituted only about one-third of our sample, so we know less about that group than we know about all adults.