

1. For each of the following situations involving sampling, identify—as precisely as possible—the population that the sample represents.
  - (a) A business school researcher wants to know what factors affect the survival and success of small businesses. She selects a sample of 150 eating-and-drinking establishments from those listed in the telephone directory for a large city.
  - (b) A member of Congress wants to know whether his constituents support proposed legislation on health care. His staff reports that 228 letters have been received on the subject, of which 193 oppose the legislation.
2. A local radio talk-show host asks viewers to call in and vote for or against a proposed plan to raise the prices charged by municipal parking meters in a downtown shopping district. 75% of the respondents are opposed to the increase. Describe one possible source of error or bias that might arise in this poll and indicate the direction in which the estimate might be biased. What is the name for this kind of bias?
3. Two different organizations conduct polls in a city whose mayor has been accused of taking bribes. One poll asks a SRS of city residents, “Do you think the mayor should resign because of accusations of his criminal activity?” The other asks, “Do you think the mayor should resign?” The first poll concluded that the majority of city residents think the mayor should resign. The second poll drew exactly the opposite conclusion. Explain why their results might be so different.

4. Your school will send a delegation of 35 seniors to a student life convention. 200 girls and 150 boys are eligible to be chosen. If a sample of 20 girls and separate sample 15 boys are each selected randomly, it gives each senior the same chance to be chosen to attend the convention.

(a) Is it an SRS? Explain.

- (b) Beginning at line 108 in the random digits table, reproduced below, select the first three senior girls to be in the sample. Explain your procedures clearly.

<b>108</b>	60940	72024	17868	24943	61790	90656	87964
	18883						
<b>109</b>	36009	19365	15412	39638	85453	46816	83485
	41979						
<b>110</b>	38448	48789	18338	24697	39364	42006	76688
	08708						

**5** For each study described below, comment on the extent to which inferences can be drawn about a larger population and whether cause and effect can be established.

- (a) A teacher wants to decide if handing out a topic outline before the final exam improves the exam scores of calculus students. He has two sections of calculus this term. His gives one class a topic outline and tell the other class to generate their own topic outline. He then compares the two sections' scores on the final exam.
  
  
  
  
  
  
  
  
  
  
- (b) Does blood type determine your personality? In a study aimed at answering this question, a random sample of 100 adults were given a personality test, and a comparison was made between the scores on the introversion/extroversion scale and blood type (A, B, AB, O).
  
  
  
  
  
  
  
  
  
  
- (c) Does using a calculator improve understanding of mathematical concepts? All 200 fifth-graders at a school are randomly assigned to one of two groups. One group studies addition of fractions with the aid of a calculator, the other studies the same topic without a calculator. Scores on a fractions test are compared after two weeks.
  
  
  
  
  
  
  
  
  
  
- 6** A few studies have suggested that people who live within a few hundred yards of high-voltage power lines are more likely to get certain forms of cancer. It would be both unethical and impractical to conduct a controlled experiment to establish cause and effect in this situation. Describe two ways in which researchers can seek to establish cause and effect that do not involve experiments.