Researchers are studying the absorption of two drugs into the bloodstream. Each drug is to be injected at three dosages. There are 24 people in the study, and they are randomly divided into six groups. Each of the six groups is randomly assigned to a different drug and dosage combination. After 30 minutes the concentration of drugs in a subject's blood is determined. Which of the following is correct?

- a. The type of drug is a factor.
- b. The dosage of the drug is a factor.
- c. Both (a) and (b) are correct.

The administration at a large state university is interested in getting the opinions of students on a proposed instructional fee for use of computer labs on campus. They select a simple random sample of 50 freshman, a simple random sample of 50 sophomores, 50 juniors, and 50 seniors. This is an example of

- a. a systematic sample.
- b. a stratified random sample.
- c. a simple random sample.

Two amateur gardeners are interested in comparing the yields of two varieties of tomatoes. They each have small backyard gardens. Each gardener is going to plant three plants of each variety in their gardens. The first gardener will select six small areas in his garden for planting and then choose three of these at random for the three plants of the first variety and then use the remaining three for the second variety. The second gardener will follow the same procedure with his own randomization in his garden. At the end of the growing season they will compare the yields of the two varieties. In this example the gardens are

- a. a lurking variable.
- b. the explanatory variable.
- c. blocks.

A study sponsored by American Express Co. and the French government tourist office found that old American stereotypes about French unfriendliness weren't true. The respondents were more than 1,000 Americans who have visited France more than once for pleasure over the past two years. The results of this study are probably

- a. very accurate given the large sample size.
- b. very inaccurate since the sample is only a small fraction of all Americans who have visited France.
- c. biased, overstating the extent to which the old stereotypes weren't true.

In order to assess the opinion of students at the University of Montana on campus snow removal, a reporter for the student newspaper interviews the first 12 students he meets who are willing to express their opinion. In this case, the population is
a. all students at universities receiving substantial snow.

b. the 12 students interviewed.

c. all students at the University of Montana.

Suppose you are going to roll a die 60 times and record \( \hat{p} \), the proportion of times that a 1 or a 2 is showing. The sampling distribution of \( \hat{p} \) should be centered about

a. 1/6.
b. 1/3.
c. 20.

A market research company wishes to find out whether the population of students at a university prefers brand A or brand B of instant coffee. A random sample of students is selected, and each one is asked to try first brand A and then brand B, or vice versa (with the order determined at random). They then indicate which brand they prefer. The response variable is

a. whether brand A or B is tried first.
b. which brand they prefer.
c. the two brands of coffee.

A researcher is interested in the cholesterol levels of adults in the city she lives in. A free cholesterol screening program is set up in the downtown area during the lunch hour. Individuals can walk in and have their cholesterol determined for free. One hundred and seventy-three people use the service and their average cholesterol is 217.8. The sample obtained is an example of

a. simple random sample since the experimenter did not know beforehand which individuals would come to the screening.
b. a stratified sample of high and low cholesterol individuals.
c. a sample probably containing bias and undercoverage.

A sample was taken of the salaries of four employees from a large company. The following are their salaries (in thousands of dollars) for this year.

33 31 24 36

The variance of their salaries is

a. 5.1.
b. 26.
c. 31.

A simple random sample of 1000 Americans found that 61% were satisfied with the service provided by the dealer from which they bought their car. A simple random sample of 1000 Canadians found that 58% were satisfied with the service provided by the dealer from which they bought their car. The sampling variability associated with these statistics is
a. about the same.

b. much smaller for the sample of Canadians since the population of Canada is smaller than that of the United States, hence the sample is a larger proportion of the population.

c. much larger for the Canadians since Canada has a lower population density than the United States, hence Canadians tend to live farther apart which always increases sampling variability.

A sociologist wants to study the attitudes of American male college students toward marriage and husband-wife relations. She gives a questionnaire to 25 of the men enrolled in Sociology 101 at her college. All 25 complete and return the questionnaire. The sample in this situation is

a. all men taking a comparable sociology class.

b. the 25 men who received and returned the questionnaire.

c. all the men in the Sociology 101 class.

There are four people in a family—a father, a mother and two children—and they have won two tickets to go to Disneyland for a week. They decide to select a sample of two people for the trip as follows. The mother and father flip a coin to see which of the two of them will go, and they then flip a coin to see which of the two children will go. This is

a. a simple random sample of size two from the family since two coins were flipped.

b. a probability sample from the family since each member of the family has a known chance of being selected to go on the trip.

c. not a probability sample since the mother and father can’t go together.

There are two statistics classes. The first has 250 students and the second has 200 students. In the first class the students are instructed to toss a coin 20 times and record the value of \( \hat{p} \), the proportion of heads. The instructor then makes a histogram of the 250 values of \( \hat{p} \) obtained. In the second class the students are instructed to toss a coin 40 times and record the value of \( \hat{p} \), the proportion of heads. The instructor then makes a histogram of the 200 values of \( \hat{p} \) obtained. The histogram of \( \hat{p} \) values for the first class should be

a. more biased since it is based on a smaller number of tosses.

b. more variable since it is based on a smaller number of tosses.

c. less variable since it is based on a larger number of students.

Twelve people who suffer from chronic fatigue syndrome volunteer to take part in an experiment to see if shark fin extract will increase one’s energy level. Eight of the volunteers are men and four are women. Half of the volunteers are to be given shark fin extract twice a day and the other half a placebo twice a day. We wish to make sure that 4 men and 2 women are assigned to each of the treatments, so we decide to use a block design with the men forming one block and the women the other. The names of the men and women are given in the chart and each name is given a numerical label.

Use the list of random digits to assign 4 men and 2 women to the shark fin treatment. Read the table from left to right, first selecting the 4 men and then the 2 women. Use the numerical labels
given in the chart to the names.

The people assigned to the shark fin treatment are

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adams</td>
<td>1 Braun</td>
</tr>
<tr>
<td>2 Barnett</td>
<td>2 Coleman</td>
</tr>
<tr>
<td>3 Charles</td>
<td>3 Miller</td>
</tr>
<tr>
<td>4 Howard</td>
<td>4 Smith</td>
</tr>
<tr>
<td>5 Lewis</td>
<td></td>
</tr>
<tr>
<td>6 Monaghan</td>
<td></td>
</tr>
<tr>
<td>7 Simpson</td>
<td></td>
</tr>
<tr>
<td>8 Taylor</td>
<td></td>
</tr>
</tbody>
</table>

Random Digits

9575 4 1 1893 9873 4021 69

a. 5, 7, 5, 4, 1, 1.

b. Lewis, Simpson, Howard, and Braun. We must give both Lewis and Braun a double dose since they are selected twice.

c. Lewis, Simpson, Howard, Adams, Braun, Miller.

A statistics instructor wants to know which route will get her to school the fastest. Each day from October 2 to November 15, when she gets to the turn point she checks the odometer on her car. If it shows an even number she takes the freeway; if it shows an odd number, she takes the in-town route. She records the total time each day. What is the explanatory variable in this study?

a. The route.

b. The odometer reading.

c. The time to school.

A statistics instructor wants to know which route will get her to school the fastest. Each day from October 2 to November 15, when she gets to the turn point she checks the odometer on her car. If it shows an even number she takes the freeway; if it shows an odd number, she takes the in-town route. She records the total time each day. What is the response variable in this study?

a. The route.

b. The odometer reading.

c. The time to school.

A statistics instructor wants to know which route will get her to school the fastest. Each day from October 2 to November 15, when she gets to the turn point she checks the odometer on her car. If it shows an even number she takes the freeway; if it shows an odd number, she takes the in-town route. She records the total time each day. This study is a(n)

a. Observational study.

b. Sample.

c. Experiment.
Ann Landers once asked her female readers whether they would be content with affectionate treatment from men, with no sex ever. Over 90,000 women wrote in, with 72% answering "Yes." Why shouldn't we believe the results of this "poll?"

- a. It was voluntary response.
- b. It wasn't stratified.
- c. The question was unclear.

A statistics instructor wants to know which route will get her to school the fastest. Each day from October 2 to November 15, when she gets to the turn point she checks the odometer on her car. If it shows an even number she takes the freeway; if it shows an odd number, she takes the in-town route. She records the total time each day. At the end of the study, if she detects a significant difference in time, can she conclude it is due to the route?

- a. Definitely not. There are lurking variables such as traffic, road construction, etc.
- b. Maybe. There are lurking variables.
- c. Yes.

A drug manufacturer is studying how a new drug behaves in patients. Investigators compare 2 doses, 5 milligrams (mg) and 10 mg. The drug can be administered by injection, skin patch, or intravenous drip. Concentration in the blood after 30 minutes is then measured. The factor(s) in this study are

- a. Drug dose.
- b. Drug dose and how it's administered.
- c. 5 mg by injection, patch or drip and 10 mg by injection, patch, or drip.

Sampling variability refers to

- a. The idea that different samples will include different individuals.
- b. The idea that different samples will give different statistics.
- c. The idea that every sample shows variability.

Assuming the population is large, which sample size will give the smallest standard deviation to the statistic?

- a. n = 100.
- b. n = 500.
- c. n = 1000.

A researcher is studying the effects of a new drug on reducing high blood pressure. He recruits 250 men to test either the new active drug against a current standard. At the end of six weeks, the decrease in systolic blood pressure will be evaluated. He believes the drug will be more effective for black men than for white men. To properly test his belief, the experiment should be
I want to take a survey of students currently enrolled in my statistics course. There are 250 of them, so I number them alphabetically from 001 to 250. Use the portion of the random number table below to select the numbers for first five to be interviewed.

69041 65817 87174 09514 8174 06423 93758 23612 1789

- a. 690, 416, 581, 787, 174
- b. 174, 095, 148, 064, 239
- c. 174, 095, 148, 174, 064

A small college has 500 Freshmen, 400 Sophomores, 350 Juniors, and 300 Seniors. They wish to conduct a survey of their students and find a simple random sample of 50 Freshmen, 40 Sophomores, 35 Juniors, and 30 Seniors. The overall sample is

- a. A stratified sample.
- b. A simple random sample.
- c. A multi-stage sample.

In a controversial election district, **73%** of registered voters are Democrat. A random survey of 500 voters had **68%** Democrats. Are the bold numbers parameters or statistics?

- a. Both are statistics.
- b. 73% is a parameter and 68% is a statistic.
- c. 73% is a statistic and 68% is a parameter.

Which sample size will give the least bias to a statistic?

- a. n = 100.
- b. n = 500
- c. We don't know.

In the 2004 presidential election, early exit polls conducted at "key precincts" indicated a strong lead for John Kerry. President George Bush ended up victorious. One problem with exit polls may be that

- a. The wrong "key precincts" were chosen.
- b. The wording of the poll questions was biased.
- c. The poll is really a voluntary response poll.
A survey interviews 1000 Americans by telephone and asks "What do you think is the biggest problem facing education today?" The population of interest for this poll is most likely

- a. American students.