

Review Exercises

MULTIPLE-CHOICE QUESTIONS

1. A marketing company offers to pay \$25 to the first 100 persons who respond to their advertisement and complete a questionnaire regarding displays of their client's product. This situation is an example of which of the following?
(A) simple random sample
(B) convenience sample
(C) voluntary response sample
(D) multistage cluster sample
(E) systematic sample
2. The AP Test Committee would like to survey principals in large urban school districts throughout New England regarding the AP curriculum. A simple random sample of large urban school districts was selected. Within each selected district, a simple random sample of high schools was chosen and each principal was interviewed. Which of the following statements regarding this design is true?
(A) This is an example of a cluster sample.
(B) Results from the interviews cannot be used to infer responses of the population of interest.
(C) The population of interest is the set of all high school principals from large urban school districts in New England.
(D) The population of interest is the set of all large urban school districts in New England.
(E) Every subset of principals has the same chance of selection.
3. Which does *not* represent a stratified design of a study involving students at your high school? For each answer choice, assume the results of the separate samples will be combined into a single sample.
(A) Two simple random samples are conducted: one of the boys in the student body and the other of the girls in the student body.
(B) Four simple random samples are conducted: one in each of the four classes.
(C) A simple random sample of homerooms is conducted. Within each selected homeroom, two random samples are conducted: one of the boys and the other of the girls.
(D) Two random samples are conducted: one of students whose GPA's are 2.5 or higher and the other of students whose GPA's are less than 2.5.
(E) All of these statements are stratified designs.

Use the following information to answer questions 4 and 5.

In order to assess the membership's attitudes about a new Supreme Court decision, a local bar association selects a simple random sample of 100 lawyers from its membership list. Surveys are delivered to the selected lawyers. Only 63 of the lawyers return their surveys.

4. Which of the following is of great concern in this situation?
(A) Nothing is known about the parameters of population of interest.
(B) Nothing is stated regarding the methodology of the simple random sample.
(C) There may be a problem with the sampling frame.
(D) There may be a problem with non-response bias.
(E) None of these statements is of concern.
5. If 43 of the respondents disagree with the new ruling, which of the following statements is true?
(A) The sample is the membership of the bar association.
(B) The sample is the 100 selected lawyers.
(C) The sample is the 63 respondents.
(D) The sample is the 43 who disagree with the new ruling.
(E) None of these is true.

Use the following excerpt from a random digit table to answer questions 6–8.

21052	65031	45074	92846	67815	78231
01548	20235	56410	82713		

6. Which of the following statements regarding this excerpt of the given random digit table is true?
(A) This table can only be used for data coded with five-digit numbers.
(B) In order to use this table for a population of 100 names, the names could be coded 00 to 99; then distinct two-digit numbers would be selected sequentially to identify chosen names.
(C) It is critical to begin the selection of random digits at the beginning of the list.
(D) This table can only be used if the data labels include all of the digits in the table.
(E) None of these statements is true.

7. If data are labeled: 1. Chevy; 2. Plymouth; 3. Lincoln; 4. Volkswagen; 5. Porsche; 6. Ford; and *single-digit* random digit selection begins at the left side of the first row, which cars would be included in a simple random sample of three cars?

- (A) Plymouth, Lincoln, Chevy
- (B) Plymouth, Chevy, Porsche
- (C) Plymouth, Ford, Porsche
- (D) Lincoln, Plymouth, Porsche
- (E) Lincoln, Ford, Plymouth

8. Which of the following statements is true?

- (A) A second sample of three beginning at a different position in the row would always produce the same set of selections.
- (B) A second sample of three beginning at a different position in the row would never include any of the cars selected in question 7.
- (C) Every subset of three cars would have the same chance of selection as the one identified in question 7.
- (D) The sample size is too large relative to the population size to conduct the sample.
- (E) None of these statements is true.

FREE-RESPONSE QUESTIONS

Open-Ended Questions

1. Consider the variable of the heights of male adults in inches. Below are listed 100 heights of male adults. Suppose that these 100 heights are the population of interest. The list is organized in five rows of twenty each.

62 65 65 67 72 74 62 68 65 59 71 70 65 69 68 63 62 65 64 67
 68 70 72 65 61 64 64 68 62 72 73 68 64 58 58 74 60 62 64 68
 69 72 75 52 54 68 67 64 64 62 60 61 71 75 72 63 63 62 68 64
 67 62 58 59 74 76 60 69 70 61 68 68 72 70 59 58 65 54 72 63
 66 67 66 62 61 68 69 71 70 75 63 61 69 69 67 72 74 60 61 69

- a. Code each of the 100 heights by its position number using one of the following options:
 - (1) If you use a random number generator on a calculator or a computer, code the heights using numbers from 1 to 100, using 1–20 in row 1, 21–40 in row 2, etc.
 - (2) If you use a random digits table, code the heights using numbers from 00 to 99, using 00–19 in row 1, 20–39 in row 2, etc.
- b. Select a simple random sample of 10 values from the set of 100. Indicate both the code number and the corresponding height in your sample.

	1	2	3	4	5	6	7	8	9	10
Code										
Value										

- c. Calculate the mean height of your sample.
- d. If the mean height of the population is 65.89 inches, comment on how accurately the mean height of your sample estimates the population mean height.

For each of the sampling procedures listed, comment on the compliance with the two conditions for valid probability-based sampling:

- 2. Voluntary Response
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 3. Convenience Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 4. Quota Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 5. Simple Random Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 6. Stratified Random Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 7. Multi-stage Random Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.
- 8. Systematic Sampling
 - a. Interviewers do not choose participants in a subjective manner, and subjects do not self-select themselves.
 - b. Selection based on probability.

