

Name _____

U5 HW #2

1. A researcher wants to interview 10 of the more than 150 people waiting in a long line to buy tickets to a concert. He walks up to the first person in line who is wearing a hat and interviews the next 10 people in line. Which of the following are true statements?
 - I. This is a simple random sample.
 - II. This design may result in selection bias.
 - III. This design suffers from response bias.
 - A. I only
 - B. II only
 - C. I and III
 - D. II and III
 - E. I, II, and III

2. When a student newspaper at a local high school took a poll of students at the school, they found that 86% said they drank alcoholic beverages in the past month. When the students were polled by the PTA, only 36% said they drank alcoholic beverages in the past month. What type of bias caused the large difference in results?
 - I. Wording bias
 - II. Sampling bias
 - III. Response bias
 - A. II only
 - B. III only
 - C. I and II
 - D. II and III
 - E. I, II, and III

3. A statistics class is made up of 20 female and 16 male students. A committee of 8 students needs to be selected. Each student is given a number from 1 to 36. A random number table is used to repeatedly select two-digit numbers until eight different numbers in the range of 1 to 36 are generated, thus forming a committee of 8 students. After the committee was formed, it was discovered that all 8 of the students were male. One of the female students in the class complained that this could not be random since only male students were selected. Which of the following statements is true?
 - A. A sample of size eight is not large enough to produce random results.
 - B. The method used did produce a random sample, even though only males were selected.
 - C. It is so unlikely to have all eight students be male that it is not a random sample.
 - D. Since the results do not reflect the composition of the class, it is not representative; therefore, it is not random.
 - E. A random number table cannot be used in this type of selection.

4. A political questionnaire is sent out to all 220,000 residents in a congressional district. Only 15,500 are returned. Of those 15,500 returned questionnaires, only 165 said that the congressman was doing a poor job in representing them. What kind of sample does this represent?
 - A. A cluster sample
 - B. A systematic sample
 - C. A representative sample
 - D. A stratified random sample
 - E. A self-selected sample

5. Why would one use a stratified random sample instead of a simple random sample?
 - A. Because a stratified sample usually produces a more representative sample
 - B. Because a smaller sample can be used
 - C. Because stratified samples are easier to collect
 - D. Because there is less bias in a stratified sample
 - E. Because systematic random samples are more random than simple random samples

6. Tom wants to survey customers of a local bank. He stands at the door of the bank and talks to every 50th customer leaving the bank. Which of the following are true?
- I. This is a simple random sample.
 - II. This is a systematic random sample.
 - III. This is a stratified random sample.
- A. I only
 - B. II only
 - C. III only
 - D. I and II
 - E. I and III
7. Each of the following three designs suffers from a form of bias. Identify the bias for each design.
- I. A school vice principal questions a random selection of students about cheating on tests and techniques they might have used recently.
 - II. A local radio talk show invites listeners to phone in their opinions on abortion.
 - III. Readers of a medical journal are taking surveys about issues concerning welfare.
- A. I–response bias, II–voluntary response bias, III–selection bias
 - B. I–voluntary response bias, II–undercoverage bias, III–response bias
 - C. I–selection bias, II–response bias, III–undercoverage bias
 - D. I–response bias, II–voluntary response bias, III–undercoverage bias
 - E. I–voluntary response bias, II–response bias, III–undercoverage bias
8. A random number table is to be used to generate five random integers from 1 to 25. Use the following table. Start with the first row and read left to right, then top to bottom. What is the 5th random integer?
- | | | | | |
|-------|-------|-------|-------|-------|
| 32111 | 74541 | 74511 | 25273 | 19336 |
| 42192 | 40935 | 52042 | 95282 | 87083 |
| 28109 | 10508 | 97961 | 95677 | 98904 |
- A. 5
 - B. 10
 - C. 19
 - D. 20
 - E. 21
9. A survey is taken of students who finished Professor Toohard’s math class. They were asked whether they would take the same professor again for a different class. Of the 85 students who responded, 67 said they would not take the professor for another class. Which of the following statements is true?
- A. The size of the survey is not large enough to produce meaningful results.
 - B. Choosing a random sample of these 85 responses would improve the reliability of the survey.
 - C. Response bias is evident in this survey.
 - D. The survey suffers from undercoverage bias since some of the students did not reply.
 - E. This is a valid survey, and the results are meaningful.

10. A telephone book is used as a source of addresses. A questionnaire about local housing issues is mailed to 1000 randomly selected households, of which 625 returned the questionnaire. What kind of bias exists in this study?
- I. Undercoverage bias
 - II. Response bias
 - III. Unintentional bias
- A. I only
 - B. II only
 - C. I and II
 - D. I and III
 - E. II and III
11. Which of the following samples does not suffer from undercoverage bias?
- A. A sample of college students drawn from calculus classes
 - B. A survey of 300 respondents to bulk email
 - C. A sample of homeowners drawn from county property tax records
 - D. A sample of doctors taken from membership rosters of the American Medical Association (AMA)
 - E. A survey of motorists at a local traffic school
12. A survey of expectant mothers was taken at the office of an OB-GYN. The survey question was, "Since smoking while pregnant has been shown to increase the risk of birth defects, do you feel that an OB-GYN should advise his patients not to smoke while pregnant?" This survey suffers from which of the following types of bias?
- I. Wording bias
 - II. Sampling bias
 - III. Response bias
- A. II only
 - B. III only
 - C. I and II
 - D. II and III
 - E. I, II, and III
13. Jack and Jill have been asked to conduct a survey of the membership of a club in which they are members. Using a systematic sample, they want to survey 5% of the membership. They obtain an alphabetized roster of the club membership. Jill wants to make sure that she is included in the survey. Her name is the 17th one on the list, so they start there and choose every 20th name after that. Which of the following statements are true about this survey?
- I. An alphabetized roster should not be used.
 - II. This is not a systematic random sample.
 - III. Response bias is guaranteed by including Jill in the survey.
- A. I only
 - B. III only
 - C. I and II
 - D. II and III
 - E. I, II, and III

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14. You have decided to use an online retailer to buy a specific book on organic gardening. On the website are 24 reader reviews for the book you were thinking of buying, and most of the reviewers were not happy with their purchase. Based on these reviews, you decide to choose another book. Which of the following statements are true about these reviews?

- I. They suffer from undercoverage bias.
 - II. They suffer from response bias.
 - III. They suffer from selection bias.
- A. I and II
 - B. I and III
 - C. II and III
 - D. I, II, and III
 - E. There is no bias since the reviews were voluntary.

Free-Response Questions

Directions: Show all work. Indicate clearly the methods you use. You will be graded on method as well as accuracy.

1. To determine the opinions of teenagers about abortion, a survey is to be taken. Write questions that involve wording bias. Phrase one question to favor abortion and the other to oppose it. Both questions should ask for an opinion about abortion.
2. Explain why systematic random samples are, or are not, simple random samples.
3. You want to use a random number table to simulate the rolling of a fair die. You want to roll the die 10 times. Construct two different procedures to carry out this process and use the following random number table to demonstrate them.

32111	74541	74511	25273	19336
42192	40935	52042	95282	87083
28109	10508	97961	95677	98904
32949	63434	28963	10330	54554

4. A club membership consists of 40 women and 50 men. You want to select 4 women and 5 men to serve on a committee. Construct a procedure to obtain a systematic random sample and a procedure to obtain a stratified random sample.
5. Explain why a convenience sample of people at a party would, or would not, be an appropriate sample for a survey about alcohol abuse.
6. You randomly select 2000 names from the subscription list of a magazine designed for hunters. You mail a questionnaire about gun control to these readers and receive 800 responses. You randomly select 300 of the 800 responses for inclusion in your study. What forms of bias are evident in this design?