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Algebra II



Surveys

Determining an unbiased, random sample. A *random sample* is one that is selected in a way that gives every different possible sample an equal chance of being chosen. Every member of the population must have the opportunity to be chosen in the sample. The sample should be large enough (30) to represent a good portion of the population.

1. A survey team wants to determine what the favorite foods are of students in a high school. Determine whether the following would be unbiased, random samples. Assume all students have a normal schedule.
 - a) Asking every fifth student entering the cafeteria
 - b) Asking all fifth period English 9 students
 - c) Asking 5 randomly selected students in every physical education class
 - d) Asking 20 randomly selected students in all study halls
 - e) Asking students whose street address name starts with a vowel
 - f) Asking randomly selected students in the culinary club
 - g) Asking all students in a randomly selected English 9, English 10, English 11, and English 12 class
 - h) Asking every fifth student entering the building in the morning
 - i) Asking every fifth student at the Varsity Basketball game

2. Determine if each of the following scenarios is an unbiased, random sample to produce accurate results. If it is not a good sample, explain why.
- a) Asking 100 randomly selected people walking into Westbury's public library what their favorite food is to determine the favorite foods of people in Westbury.

 - b) Asking 85 randomly selected people walking into Westbury's public library what their favorite food is to determine the favorite foods of people in the United States.

 - c) Asking 80 randomly selected people at Westbury's football game what their favorite sport is to determine the favorite sports of people in Westbury

 - d) Asking 15 randomly selected teenagers at the Broadway Mall what their favorite type of music is to determine the favorite type of music for teenagers that live near the Broadway Mall.

 - e) Asking 100 randomly selected teenagers at the Broadway Mall what their favorite type of music is to determine the favorite type of music for teenagers that live near the Broadway Mall.

 - f) Asking 50 randomly selected people walking down Westbury's main street who their favorite athlete is to determine who Westbury's favorite athletes are.

 - g) Posting a QR code at Westbury High School for to determine interest in a cooking club at Westbury High School.

- h) Asking 10 randomly selected people at every library in the United States what their favorite streaming service is to determine favorite streaming services of people in the United States.

- i) Asking 5 randomly selected adults at a supermarket in Westbury what type of entertainment they prefer to determine the types of entertainment adults in Westbury prefer

- j) Asking 100 randomly selected people at a rap concert in New York what their favorite type of music is to determine what New Yorker's favorite type of music is.

- k) Asking 50 randomly selected people at a Dominican Restaurant in Westbury what their favorite type of food is to determine what people in Westbury's favorite types of food are.

- l) Posting a phone number to call on the back of a truck to comment on what drivers think of the truck driver's driving

- m) Asking 75 randomly selected students in the Westbury High School 9th grade cafeteria what their favorite type of music is to determine the favorite type of music of Westbury High School students.

- n) Asking 40 randomly selected Westbury High School Seniors where they plan to go to college to determine where Westbury High School Seniors plan to go to college.

3. Which statement(s) about statistical studies is true?

- I. A survey of all English classes in a high school would be a good sample to determine the number of hours students throughout the school spend studying.
 - II. A survey of all ninth graders in a high school would be a good sample to determine the number of student parking spaces needed at that high school.
 - III. A survey of all students in one lunch period in a high school would be a good sample to determine the number of hours adults spend on social media websites.
 - IV. A survey of all Calculus students in a high school would be a good sample to determine the number of students throughout the school who don't like math.
- 1) I, only 2) II, only 3) I and III 4) III and IV

4. Which survey is *least* likely to contain bias?

- 1) surveying a sample of people leaving a movie theater to determine which flavor of ice cream is the most popular
- 2) surveying the members of a football team to determine the most watched TV sport
- 3) surveying a sample of people leaving a library to determine the average number of books a person reads in a year
- 4) surveying a sample of people leaving a gym to determine the average number of hours a person exercises per week

5. A survey is to be conducted in a small upstate village to determine whether or not local residents should fund construction of a skateboard park by raising taxes. Which segment of the population would provide the most unbiased responses?

- 1) a club of local skateboard enthusiasts
- 2) senior citizens living on fixed incomes
- 3) a group opposed to any increase in taxes
- 4) every tenth person 18 years of age or older walking down Main St.

7. A survey is being conducted about American's favorite musicians. Which of the following survey methods would most likely produce a random sample?

- (1) Asking every 20th person at a Green Day concert
- (2) Asking every 10th person at a vintage record store
- (3) Asking every 10th person at the Westbury Public Library
- (4) Sending out surveys to random households across the country.

8. Which method of collecting data would most likely result in an unbiased random sample?
- (1) selecting every third teenager leaving a movie theater to answer a survey about entertainment
 - (2) placing a survey in a local newspaper to determine how people voted in the 2004 presidential election
 - (3) selecting students by the last digit of their school ID number to participate in a survey about cafeteria food
 - (4) surveying honor students taking Trigonometry to determine the average amount of time students in a school spend doing homework each night

9. A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?
- (1) the size of the sample
 - (2) the size of the population
 - (3) the method of analyzing the data
 - (4) the method of choosing the students who were surveyed

10. The yearbook staff has designed a survey to learn about student opinions on how the yearbook could be improved for this year. If they want to distribute this survey to 100 students and obtain the most reliable data, they should survey
- (1) Every third student sent to the office
 - (2) Every third student to enter the library
 - (3) Every third student to enter the gym for the basketball game
 - (4) Every third student arriving at school in the morning

11. Chuck's Trucking Company has decided to initiate an Employee of the Month program. To determine the recipient, they put the following sign on the back of each truck. The driver who receives the highest number of positive comments will win the recognition. Explain *one* statistical bias in this data collection method.

