AP Statistics - SS: Sampling Strategies

AP Statistics Sampling Strategies (SS) - 26 questions

26 Questions | 52 min

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1. An online retailer wishes to survey its customers. The decision is made to select randomly 50 customers who pay with credit cards, 25 customers who pay with debit cards, and 10 customers who pay with checks. This procedure is an example of which type of sampling?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

2. Which of the following is a true statement about sampling?

(A) Data obtained when conducting a census are always more accurate than data obtained from a sample, no matter how careful the design of the sampling method.

(B) The sampling frame is the population of interest.

(C) Sampling error implies an error, possibly very small but still an error, on the part of the surveyor.

(D) Careful analysis of a given sample will indicate whether or not it is random.

(E) The clusters in cluster sampling should all look pretty much alike.

3. Sampling error occurs

(A) when samples are too small

(B) when interviewers make mistakes resulting in bias

(C) when interviewers use judgment instead of random choice in picking the sample

(D) because a sample statistic is used to estimate a population parameter

(E) in all of the above cases

4. A town has one high school, which buses students from urban, suburban, and rural communities. Which of the following sampling techniques is most recommended in studying high school students' attitudes toward college versus trade school after high school graduation?

(A) Cluster (B) Simple random (C) Stratified (D) Systematic (E) Voluntary response

5. A company wishes to survey what people think about a new product it plans to market. The company decides to sample randomly from their large employee database as this includes phone numbers and addresses. This procedure is an example of which type of sampling?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

6. Each of the 31 National Hockey League teams carries a 20-person roster. A sample of 62 players (10% of all 620 players) will be selected to undergo drug tests. To do this, each team is instructed to put the names of the 20 players into a hat and randomly draw 2 names. Will this method result in a simple random sample of the 620 hockey players?

(A) Yes, because each player has the same chance of being selected

(B) Yes, because each team is equally represented

(C) Yes, because this is an example of stratified sampling, which is a special case of simple random sampling

(D) No, because the teams are not chosen randomly

(E) No, because not each group of 62 players has the same chance of being selected

7. The United States Tennis Association (USTA) plans to survey 50 of the 1,000 top-rated tennis players in the United States. A list of the players by rank is made available, and a random number between 1 and 20 is picked. The sample consists of the person that number down the list together with every 20th person after that. This procedure is an example of which type of sampling?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

8. A travel agent plans to survey passengers taking the cross-Canada train trip from Vancouver to Toronto. She is considering two sampling methods. Method 1: From a boarding list, randomly choose 15 passengers traveling first class (who have roomettes for sleeping) and 35 passengers traveling coach (who have reclining chairs for sleeping). Method 2: Randomly select one of the cars (each holds 50 passengers), and survey all the passengers in that car. Identify each sampling method.

(A) Method 1 is cluster sampling, and Method 2 is stratified sampling.

(B) Method 1 is cluster sampling, and Method 2 is systematic sampling.

(C) Method 1 is stratified sampling, and Method 2 is cluster sampling.

(D) Method 1 is stratified sampling, and Method 2 is simple random sampling.

(E) Method 1 is simple random sampling, and Method 2 is cluster sampling.

9. A polling company conducts a weekly survey to determine the proportion of voters who support the direction Congress is taking. For the coming year, the company decides to double the sample size. The main benefit of this is to

(A) eliminate sampling error

(B) decrease population variability

(C) reduce undercoverage bias

(D) reduce nonresponse bias

(E) decrease the standard deviation of the sampling distribution

10. The athletic office at a large university is thinking of allowing women to try out for the baseball team and decides to survey student opinion with a stratified sample based on gender. Which of the following will achieve the desired sampling plan?

(A) Using a list of all students on campus, randomly select a starting name and every 10th name thereafter. Separate the groups by gender until the desired sample size is attained.

(B) Using a numbered list of all students on campus and a random number generator, select numbers between 1 and the size of the student body until the desired sample size is reached. A repeat of a selected number is disregarded. Separate selected students by gender.

(C) Select all students from a campus dormitory that is representative of all students on campus. Separate students by gender.

(D) Select separate random samples of females and males based on the proportions of females and males on campus.

(E) Select a random sample of students attending the next baseball game. Separate the students by gender.

11. To gauge patron use of city libraries, all patrons who check out books from randomly selected libraries will be surveyed. This procedure is an example of which type of sampling?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

12. An IRS agent is given an assignment to choose and audit the tax returns of 260 companies claiming large refunds. She has an assistant list all companies whose name begins with A, assigns each a number, and uses a random number generator to pick 10 of these numbers and thus 10 companies. She proceeds to use the same procedure for each letter of the alphabet and combines the results into a group of 260. Which of the following is a true statement?

(A) Her procedure makes use of chance.

(B) Her procedure results in a simple random sample.

(C) Each company has an equal probability of being selected.

(D) The company named Amazon probably has a higher probability of being selected than the company named Xerox.

(E) This is an example of a systematic sample.

13. A government pollster is planning to survey randomly 50 voters in each of a state's 102 counties regarding a proposed change in the state income tax code. Why is stratification used here?

(A) Stratification helps remove bias when estimating proportions, in this case the proportion of voters favoring the change in code.

(B) Stratification helps remove bias when estimating means, in this case the mean number of voters favoring the change in code.

(C) Stratification helps remove bias when estimating variances, in this case the variance in the number of voters favoring the change in code.

(D) Stratification helps reduce sampling variability.

(E) Stratification is generally the procedure of choice when efficiency and cost is of paramount interest.

14. Which of the following statements about sampling error is incorrect?

(A) Sampling error is generally smaller when the sample size is larger.

(B) Sampling error concerns natural variation among samples, is always present, and can be described using probability.

(C) Sampling error is greater when working with higher confidence levels.

(D) Sampling error is unrelated to bias.

(E) Sampling error can be eliminated only if a survey is both extremely well designed and extremely well conducted.

15. A cybersecurity analyst wishes to survey her client base of 63 companies as to their vulnerability to a new computer virus. She has 63 business cards, all of the identical size, from her contacts in the companies. The analyst decides to drop all of the business cards into a small box, shake them up, and reach in to pick 5 cards for her sample. This procedure is an example of which type of sampling?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

16. The Environmental Protection Agency (EPA) is concerned about a region near an old industrial waste dump and plans to take soil samples to test for toxic chemicals. The EPA is considering using either vertical or horizontal strips with regard to sampling, as shown in the figures below. What are the two most appropriate sampling techniques?

(A) Stratified sample with vertical strips or cluster sample with vertical strips

(B) Stratified sample with vertical strips or cluster sample with horizontal strips

(C) Stratified sample with horizontal strips or cluster sample with vertical strips

(D) Stratified sample with horizontal strips or cluster sample with horizontal strips

(E) None of the above are pairs where both techniques are appropriate.

17. A study is made on whether a particular review book helps students achieve higher scores on the AP Statistics Exam. In comparing the records of 200 students, half of whom purchased the review book, it is noted that the average AP Statistics score is higher for those 100 students who purchased the book. Which of the following are true statements? I. Although this study indicates a relation, it does not prove causation. II. There could well be a confounding variable responsible for the seeming relationship. III. Self-selection here makes drawing a conclusion difficult.

(A) I only (B) I and II only (C) I and III only (D) II and III only (E) I, II, and III

18. Which of the following would best help avoid response bias?

(A) Proper use of randomization

(B) A larger sample size

(C) A smaller sample size

(D) A longer survey

(E) Careful wording of the questions

19. A buffet restaurant features a salad bar, a chicken and beef entree station, a seafood station, a pizza station, a vegetable station, and a dessert bar, with a total of 235 items. What kind of sampling procedure would be recommended for use by a visiting restaurant evaluator?

(A) A simple random sample

(B) A stratified sample

(C) A cluster sample

(D) A systematic sample

(E) A convenience sample

20. A dietary supplement manufacturer wants to test consistency of the krill oil content of omega-3 supplements produced in one factory. The company decides to select one bottle of capsules randomly from each day's production run at the factory and analyze every capsule in this bottle as to krill oil content. What type of sampling is this?

(A) Cluster (B) Convenience (C) Simple random (D) Stratified (E) Systematic

21. A study is made to determine whether taking multiple AP classes in high school eventually leads to a higher 4-year graduation rate from college. In comparing the college records of 250 students, half of whom took multiple AP courses in high school, it is determined that a higher proportion of the students who took the AP courses graduated from college in four years than did students who had not taken these courses. Based on this study, students are encouraged to take multiple AP courses. Which of the following is an incorrect statement?

(A) This is an observational study, not an experiment.

(B) Self-selection here makes drawing conclusions such as encouraging more AP enrollment difficult.

(C) Although this study indicates a relation, it does prove causation.

(D) There could well be a confounding variable responsible for the seeming relationship.

(E) A more meaningful study would be to compare a simple random sample (SRS) from each of the two groups of 125 students.

22. A survey with regard to using park funds for building a new skateboard facility resulted in the following table.

Age	21-30	31-40	41-50	51-60	61-70	71-80	Total
For	35	22	18	15	5	1	96
Against	20	33	37	40	50	54	234

Which of the following sampling strategies was most likely used?

(A) Simple random (B) Cluster (C) Stratified (D) Systematic (E) Proportional

23. To survey the opinions of people attending a Lincoln Center ballet, a surveyor plans to select every 30th theatergoer as he or she exits at the conclusion. Will this method result in a simple random sample?

(A) Yes, because each theatergoer has the same chance of being selected

(B) Yes, but only if everyone leaves by the same exit

(C) Yes, because the 29 out of 30 theatergoers who are not selected will form a control group

(D) Yes, because this is an example of systematic sampling, which is a special case of simple random sampling

(E) No, because not every sample of the intended size has an equal chance of being selected

24. To conduct a survey on television viewing preferences, a researcher opens a telephone book to a random page, closes his eyes, puts his finger down on the page, and then reads off the next 80 names. Which of the following is not a true statement?

(A) The survey incorporates chance.

(B) The procedure will not give a simple random sample.

(C) The procedure results in a systematic sample.

(D) The procedure could easily result in selection bias.

(E) The use of a phone book will result in undercoverage bias.

25. The annual AP national conference is attended by a large number of AP teachers from all AP subject areas. At one of these conferences, a random sample of AP Statistics teachers at the conference was selected and surveyed as to the proportion of their students who go on to do well in college. To what population can the result be generalized?

(A) All students

(B) All students taking an AP course

(C) All students taking AP Statistics

(D) Students of all AP teachers who attended the conference

(E) Students of all AP Statistics teachers who attended the conference

26. Sampling error is

(A) the result of bias

(B) the mean of a sample statistic

(C) the standard deviation of a sample statistic

(D) the standard error of a sample statistic

(E) the difference between a population parameter and an estimate of that parameter