Math 102 Bank of Questions section 10

1. An analyst interviews 50 out of the 200 city council members in a metropolitan area.

   a. What is the sample size?

   b. What is the population size?

2. A professor surveys 60 of the 150 school board members in various districts across the state.

   a. What is the sample size?

   b. What is the population size?

3. A sociologist gathers data from 80 out of 250 city representatives on urban planning strategies.

   a. What is the size of the sample?

   b. What is the size of the population?

4. A marketing researcher surveys 120 out of 500 employees at a tech company about job satisfaction.

   a. What is the size of the sample?

   b. What is the size of the population?

5. A company has 2,500 employees. A survey of 200 randomly selected employees was conducted to evaluate job satisfaction. 120 said they were satisfied, 60 said they were unsatisfied, and 20 were undecided.

   Describe the population the surveyors are really interested in.

   A. All citizens in the city

   B. All employees of the company

   C. All employees who responded to the survey

   D. The 200 employees surveyed

   E. The 120 employees who were satisfied

   F. None of the above

6. A high school has 1,200 students. A survey of 150 randomly selected students was conducted to understand opinions about the new uniform policy. 90 supported the policy, 40 opposed it, and 20 were undecided.

   Describe the population the surveyors are really interested in.

   A. All parents of the students

   B. All students in the high school

   C. All students with uniforms

   D. The 150 students surveyed

   E. The 90 students who supported the policy

   F. None of the above

7. A hospital has 3,000 patients. A survey of 400 randomly selected patients was conducted to gauge satisfaction with hospital services. 250 said they were satisfied, 100 were unsatisfied, and 50 were neutral.

   Describe the population the surveyors are really interested in.

   A. All citizens in the city
   B. All patients in the hospital
   C. All patients who filled out the survey
   D. The 400 patients surveyed
   E. The 250 patients who were satisfied
   F. None of the above

8. A town has 5,000 registered voters. Two candidates, Wilson and King, are running for mayor. The day before the election, an online poll of 300 randomly selected voters was conducted. 160 said they'd vote for Wilson, 120 for King, and 20 were undecided.

   Describe the population actually represented by this survey.

   A. All citizens of the town
   B. All registered voters in the town
   C. All registered voters with internet access in the town
   D. The 300 voters surveyed
   E. The 160 voters who said they'd vote for Wilson
   F. None of the above

9. A university has 10,000 students. Two candidates, Davis and Lee, are competing for student body president. A survey of 250 students was conducted during lunchtime at the campus cafeteria. 140 said they'd vote for Davis, 80 for Lee, and 30 were undecided.

   Describe the population actually represented by this survey.

   A. All students at the university
   B. All students registered to vote in the election
   C. All students who eat lunch at the campus cafeteria
   D. The 250 students surveyed
   E. The 140 students who said they'd vote for Davis
   F. None of the above

10. A company has 1,200 employees. A survey was conducted by email to gather preferences for a new company benefits plan. 100 employees responded, with 60 preferring Plan A, 30 preferring Plan B, and 10 undecided.

    Describe the population actually represented by this survey.

    A. All employees at the company
    B. All employees with email access at the company
    C. All employees who responded to the survey
    D. The 100 employees surveyed
    E. The 60 employees who preferred Plan A
    F. None of the above

11. A town has 8,000 registered voters. Two candidates, Garcia and Patel, are running for mayor. The day before the election, an online poll of 500 randomly selected registered voters was conducted. 300 said they'd vote for Garcia, 180 said they'd vote for Patel, and 20 were undecided. Describe the sample for this survey.

    A. All citizens of the town
    B. All registered voters in the town
    C. All registered voters with internet access in the town
    D. The 500 voters surveyed
    E. The 300 voters who said they'd vote for Garcia
    F. None of the above

12. A company has 3,000 employees. Two candidates, Nassar and Liu, are running for union president. A survey by email was conducted among 250 randomly selected employees. 120 said they'd vote for Nassar, 100 for Liu, and 30 were undecided. Describe the sample for this survey.

    A. All employees at the company
    B. All employees with email access at the company
    C. All employees who received the survey
    D. The 250 employees surveyed
    E. The 120 employees who said they'd vote for Nassar
    F. None of the above

13. The county of Brookfield has 12,500 registered voters. Two candidates, Smith and Jones, are running for county commissioner. The day before the election, a telephone poll of 250 randomly selected registered voters was conducted. 85 said they'd vote for Smith, 150 said they'd vote for Jones, and 15 were undecided.

    a. Give the sample statistic for the proportion of voters surveyed who said they'd vote for Smith.
    b. This sample statistic suggests that we might expect _____ of the 12,500 registered voters to vote for Smith.

14. The town of Lakeside has 6,200 registered voters. Two candidates, Taylor and Morgan, are running for mayor. A door-to-door survey of 150 randomly selected registered voters was conducted. 45 said they'd vote for Taylor, 90 said they'd vote for Morgan, and 15 were undecided.

    a. Give the sample statistic for the percentage of voters surveyed who said they'd vote for Taylor.
    b. This sample statistic suggests that we might expect _____ of the 6,200 registered voters to vote for Taylor.

15. Determine whether the value 25% is a parameter or statistic: 25% of households in a city use renewable energy sources.

    A. Statistic
    B. Parameter

16. Determine whether the value 40% is a parameter or statistic: 40% of all employees in a company received a promotion last year.

    A. Statistic
    B. Parameter

17. In a study, the data you collect is number of hours worked per week. This data is:

    A. Quantitative
    B. Qualitative (Categorical)

18. In a study, the data you collect is age of participants. This data is:

    A. Quantitative
    B. Qualitative (Categorical)

19. In a study, the data you collect is types of pets owned by households (e.g., dog, cat, bird, fish). This data is:

    A. Quantitative
    B. Qualitative (Categorical)

20. In a study, the data you collect is zip codes of customers. This data is:

    A. Quantitative
    B. Qualitative (Categorical)

21. Which source of bias is most relevant to the following situation: A survey asks: "Do you support increased funding for mental health services even if it means higher taxes?"

    A. Self-interest study
    B. Voluntary response bias
    C. Nonresponse bias or missing data
    D. Perceived lack of anonymity
    E. Loaded or leading question

22. Which source of bias is most relevant to the following situation: A survey asks: "How often do you use our product, considering it is the best option available?"

    A. Self-interest study
    B. Voluntary response bias
    C. Nonresponse bias or missing data
    D. Perceived lack of anonymity
    E. Loaded or leading question

23. In a study, the sample is chosen by randomly selecting 30 employees from a company's complete list of employees using a random number generator. What is the sampling method?

    A. Simple Random
    B. Stratified
    C. Convenience
    D. None of these

24. In a study, the sample is chosen by selecting 25 participants who are available at a local community center at the time of the survey. What is the sampling method?

    A. Simple Random
    B. Stratified
    C. Convenience
    D. None of these

25. To determine how people in a city feel about public transportation, a survey was conducted by selecting 100 residents from a neighborhood known for its high use of public transportation. The results of this survey are unreliable primarily because of:

    A. The absence of a control group
    B. Response bias
    C. Sampling bias
    D. Voluntary response bias
    E. None of the above

26. To evaluate employee satisfaction in a large corporation, a survey was conducted by selecting 50 employees from the IT department and 50 from the marketing department. The results of this survey are unreliable primarily because of:

    A. The absence of a control group
    B. Response bias
    C. Sampling bias
    D. Voluntary response bias
    E. None of the above

27. In a study, the data you collect is levels of satisfaction rated as Very Satisfied, Satisfied, Neutral, Dissatisfied, and Very Dissatisfied. This data is:

    A. Quantitative
    B. Qualitative (Categorical)

28. In a study, the data you collect is categories of customer feedback such as Excellent, Good, Fair, Poor, and Very Poor. This data is:

    A. Quantitative
    B. Qualitative (Categorical)

29. Does this describe an observational study or an experiment? A new teaching method is implemented in several classrooms, and student performance is measured over a semester.

    A. Observational Study
    B. Experiment

30. Does this describe an observational study or an experiment? Researchers track the daily exercise habits of people and record their health outcomes over the course of a year.

    A. Observational Study
    B. Experiment

31. Does this describe an observational study or an experiment? A group of participants is divided into two groups, one receiving a specific diet plan and the other following their usual diet, and their weight loss is compared after three months.

    A. Observational Study
    B. Experiment

32. A research team is evaluating the impact of a new teaching method on student performance. They randomly assign students into two groups. Group 1 is taught using the new teaching method, while Group 2 continues with the traditional teaching method. Neither the students nor the teachers know which method is being used for each group.

    a. Which is the treatment group?
        A. Group 1
        B. Group 2
        C. Neither group
    b. Which is the control group (if there is one)?
    c. Is this study blind, double blind, or neither?
        A. Blind
        B. Double-blind
        C. Neither
    d. Which best describes this research?
        A. Survey
        B. Controlled Experiment
        C. Experiment
        D. Placebo Controlled Experiment

33. A study is conducted to assess the effectiveness of a new pain relief medication. Participants are randomly assigned to two groups.

    Group 1 receives the new pain relief medication, and Group 2 receives a standard pain relief medication.

    Neither the participants nor the healthcare providers administering the medication are aware of which group is receiving which treatment.

    a. Which is the treatment group?
        A. Group 1
        B. Group 2
        C. Neither group
    b. Which is the control group (if there is one)?
    c. Is this study blind, double blind, or neither?
        A. Blind
        B. Double-blind
        C. Neither
    d. Which best describes this research?
        A. Survey
        B. Controlled Experiment
        C. Experiment
        D. Placebo Controlled Experiment

34. In a science experiment, a biologist has a tank filled with 500 fish, 300 of which are goldfish and 200 are guppies. The biologist tells the students the tank has 500 fish and asks them to estimate how many are guppies without counting them all.

    A student uses a net to catch 50 fish from the tank, finding that 20 are guppies.

    a. The data collection method can best be described as:
        A. Clinical study
        B. Survey
        C. Census
        D. Controlled study

b. The target population consists of:

   A. The 500 fish in the tank
   B. The 250 goldfish in the tank
   C. The 50 fish the student observed
   D. The 30 guppies the student observed
   E. None of the above

c. The sample consists of:

   A. The 250 goldfish in the tank
   B. The 30 guppies observed by the student
   C. The 50 fish observed by the student
   D. The 200 guppies in the tank
   E. None of the above

d. Based on the sample, the student would estimate that ___ fish in the tank were guppies.

   A. 100
   B. 120
   C. 150
   D. 200
   E. None of the above

35. A clinical trial evaluates the effectiveness of a new cholesterol medication. The study involves 400 participants who are randomly assigned to one of two groups. The first group of 200 participants receives the new medication. The second group of 200 receives a placebo. Participants are aware of their treatment assignment, as are the people administering the medication.

    a. In this study, which is the control group?

       A. The 400 participants
       B. The first group of 200 receiving the new medication
       C. The second group of 200 receiving the placebo
       D. There is no control group.

    b. This study is:

       A. Blind, but not double-blind
       B. Not blind
       C. Double-blind
       D. Not an experiment
       E. None of the above

36. To investigate the impact of a new diet on weight loss, a researcher conducts the following study: 80 participants (50 men and 30 women) are selected. Their weights are measured before starting the diet. The researcher gives all the men a meal plan with the new diet and all the women a meal plan with a standard diet, but only the researcher knows which meal plan is which.

    The results of the study are likely to be invalid mostly because:

    A. The treatment group and control group were not the same size.
    B. The gender of the participants is a confounding variable in this study.
    C. The participants were selected from a specific age group.
    D. The participants did not know if they were receiving the new or standard diet.
    E. None of the above

37. A researcher investigating opinions on public transportation efficiency surveys a randomly selected group of 180 commuters who all use a specific subway line. 80% of those surveyed indicated that they find the subway line to be efficient. The researcher concluded that "a large majority of commuters find public transportation efficient."

    This conclusion might be invalid because:

    A. 80% is not a large majority.

    B. The sample is not representative of all commuters, just those on one subway line.

    C. The sample size is too small.

    D. There was no control group.

    E. None of the above

38. In a study, the sample is chosen by separating all cars by size, and then selecting 10 of each size grouping. What is the sampling method?

    A. Simple Random

    B. Stratified

    C. Convenience

    D. None of these

39. As part of a statistics project, a teacher brings a bag of marbles containing 700 white marbles and 300 red marbles. She tells the students the bag contains 1000 total marbles, and asks her students to determine how many red marbles are in the bag without counting them.

    A student randomly draws 150 marbles from the bag. Of the 150 marbles, 47 are red.

    a. The data collection method can best be described as

        A. Controlled study

        B. Clinical study

        C. Survey

        D. Census

    b. The target population consists of

        A. The 300 red marbles in the bag

        B. The 1000 marbles in the bag

        C. The 47 red marbles drawn by the student

        D. The 150 marbles drawn by the student

        E. None of the above

    c. The sample consists of

        A. The 150 marbles drawn by the student

        B. The 1000 marbles in the bag

        C. The 300 red marbles in the bag

        D. The 47 red marbles drawn by the student

        E. None of the above

    d. Based on the sample, the student would estimate that how many marbles in the bag are red?

        A. 100

        B. 150

        C. 200

        D. 250

        E. None of the above