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Name:_____ Class:_____ Date:_____

Chapter 01 - Overview and Descriptive Statistics

1. A What type of study is described when an experiment is conducted to analyze how the flow rate through a solenoid valve in an automobile's pollution-control system depends on three factors: armature lengths, spring load, and bobbin depth, with two different levels (low and high) for each factor?

a. Descriptive Study
b. Experimental Study
c. Qualitative Study
d. Analytic Study

ANSWER: d

2. A sample of $n = 10$ automobiles was selected, and each was subjected to a 5-mph crash test. Denoting a car with no visible damage by S (for success) and a car with such damage by F, results were as follows: S S S F F S S F S S. What is the value of the sample proportion of successes x/n?

a. 5/10 = .50
b. 6/10 = .60
c. 7/10 = .70
d. 8/10 = .80

ANSWER: c

3. True/False: A population includes every member of a defined group, while a sample consists of only a portion of that group.

a. True
b. False

ANSWER: True

4. Which statement correctly defines a sample in the context of research studies?

a. Only groups of individuals being studied
b. A subset of the population
c. All of the subsets in a given population
d. Selected individuals in a study

ANSWER: b

5. What is the primary purpose of using a sample instead of a population in research?

a. To minimize the time and resources needed for data collection
b. To gather data from every individual
c. To make studying more manageable and cost-effective
d. To ensure complete accuracy in the findings

ANSWER: c

6. True/False: A hypothetical population refers to a group that cannot be directly observed or measured.

a. True
b. False

ANSWER: True

7. Which is an example of a concrete population?

a. All the students currently enrolled in a school

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b. All potential voters in an upcoming election
c. All possible outcomes of a dice roll
d. All the people who have ever lived

ANSWER: a

8. In research, which statement is true regarding a hypothetical population?
a. It is always measurable.
b. It exists only in theory.
c. It includes all known individuals.
d. It can be accurately sampled.

ANSWER: b

9. True/False: A convenience sample is one of the best ways to ensure a representative sample of a population.
a. True
b. False

ANSWER: False

10. Which is a recognized type of sampling method?
a. Random sampling
b. Stratified sampling
c. Purposive sampling
d. Randomized control trial

ANSWER: a

11. What is the main advantage of using stratified sampling?
a. It ignores the population's diversity.
b. It ensures every subgroup is represented.
c. It is the quickest method available.
d. It relies on convenience.

ANSWER: b

12. True/False: True or False: Inferential statistics allow researchers to draw conclusions about a population based on the analysis of sample data.
a. True
b. False

ANSWER: True

13. What is the relationship between probability and inferential statistics?
a. Probability has no role in inferential statistics.
b. Inferential statistics relies on probability to make predictions.
c. Inferential statistics is not applicable to sample data.
d. Probability is primarily utilized in descriptive statistics.

ANSWER: b

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14. If a sample is randomly selected, what can be inferred about the population?
    a. It may contain biases that affect the results.
    b. It provides a reliable estimate of the population parameters.
    c. It is less useful for drawing conclusions about the population than a non-random sample.
    d. It can give insights into the characteristics of the population.

ANSWER: b

15. True/False: An analytical study focuses on understanding relationships and causal effects between variables, while an enumerative study primarily counts and describes characteristics of a population.
    a. True
    b. False

ANSWER: True

16. Which describes an enumerative study?
    a. Evaluates the cause-and-effect relationship
    b. Provides a count or description of a population
    c. Tests a hypothesis
    d. Involves manipulating variables

ANSWER: b

17. Which type of study would likely examine the factors influencing student performance?
    a. Enumerative
    b. Analytical
    c. Descriptive
    d. Experimental

ANSWER: b

18. True/False: When analyzing a population, using stratified sampling can lead to more accurate representations of subgroups compared to simple random sampling, as it ensures that each subgroup is adequately represented in the sample.
    a. True
    b. False

ANSWER: True

19. Which represents a sampling method used in research?
    a. Stratified sampling
    b. Quota sampling
    c. Observational study
    d. Randomized control trial

ANSWER: b

20. What is the main disadvantage of convenience sampling?
    a. It is time-consuming.
    b. It may not be representative of the population.
    c. It is overly complex.

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d. It is the most expensive method.

ANSWER: b

21. True/False: Analyzing a stem-and-leaf plot allows you to determine not only the shape of the data distribution but also to identify patterns such as outliers, gaps, and the overall spread of the data.

a. True

b. False

ANSWER: True

22. In a stem-and-leaf plot, what does the "stem" represent?

a. The last digit of the data values

b. The leading digits of the data values

c. The frequency of the data values

d. The total number of data values

ANSWER: b

23. What can you determine from a stem-and-leaf plot?

a. The mode of the dataset

b. The individual data points of the dataset

c. The total number of data points in the dataset

d. The mean of the dataset

ANSWER: a

24. True/False: A stem-and-leaf plot can be used to display both the shape and the frequency of a dataset.

a. True

b. False

ANSWER: True

25. Which of the following datasets can be represented using a stem-and-leaf plot?

a. {10, 12, 13, 15}

b. {1.5, 2.5, 3.5, 4.5}

c. {5, 8, 10, 12.5}

d. {-5, 8, 1.10, 12.5}

ANSWER: a

26. When constructing a stem-and-leaf plot for the data {22, 23, 25, 30, 31}, the "stem" for the number 22 would be_____.

a. 2

b. 22

c. 3

d. 25

ANSWER: a

27. True/False: A dotplot displays individual data points as dots above a number line.

a. True

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b. False

ANSWER: True

28. In a dotplot, multiple dots stacked above a number indicate what?
    a. The number appears once in the dataset
    b. The number appears multiple times in the dataset
    c. The number is the highest value
    d. The number is the lowest value

ANSWER: b

29. What does a dotplot help you visualize?
    a. The mean of the data
    b. The distribution of the data
    c. The median of the data
    d. The total sum of the data

ANSWER: b

30. True/False: The number of students in a classroom is an example of continuous data.
    a. True
    b. False

ANSWER: False

31. Which is an example of discrete data?
    a. Height of students
    b. Distance traveled
    c. Number of cars in a parking lot
    d. Weight of a person

ANSWER: c

32. Which statement best describes continuous data?
    a. It can only take on specific values.
    b. It can take on any value within a range.
    c. It is always a whole number.
    d. It cannot be measured.

ANSWER: b

33. True/False: A histogram displays the frequency of data within specified intervals.
    a. True
    b. False

ANSWER: True

34. In a histogram, what does the height of each bar represent?
    a. The total number of data points
    b. The frequency of data points within that interval

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c. The average of the data
d. The minimum value of the data

ANSWER: b

35. What does a histogram allow you to visualize?
a. The relationship between two variables
b. The distribution of data across different intervals
c. The exact values of each data point
d. The mode of the dataset

ANSWER: b

36. True/False: A histogram can be used to represent categorical data.
a. True
b. False

ANSWER: False

37. When constructing a histogram for continuous data, what should you do?
a. Use individual data points as bars
b. Group data into intervals
c. Use letters instead of numbers
d. Display only the highest value

ANSWER: b

38. Which type of data is best represented by a histogram?
a. Continuous
b. Categorical
c. Nominal
d. Discrete

ANSWER: a

39. True/False: A distribution with two peaks is classified as unimodal.
a. True
b. False

ANSWER: False

40. Which describes a bimodal distribution?
a. A distribution with one peak
b. A distribution with two peaks
c. A distribution with no peaks
d. A distribution with more than two peaks

ANSWER: b

41. How can you determine if a distribution is multimodal?
a. Count the number of peaks in the distribution

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b. Calculate the mean of the data
c. Measure the range of the data
d. Analyze the individual data points

ANSWER: a

42. True/False: A symmetric distribution has equal tails on both sides of the mean.
a. True
b. False

ANSWER: True

43. If a distribution has a longer tail on the left side, it is classified as what?
a. Symmetric
b. Positively skewed
c. Negatively skewed
d. Unimodal

ANSWER: c

44. What does it mean if a distribution is positively skewed?
a. The majority of data points are concentrated on the left side.
b. The majority of data points are concentrated on the right side.
c. The distribution has no peaks.
d. The distribution is perfectly symmetric.

ANSWER: a

45. True/False: The sample mean is always equal to the sample median.
a. True
b. False

ANSWER: False

46. What is the primary numerical measure used to describe the center of a dataset?
a. Mode
b. Mean
c. Range
d. Variance

ANSWER: b

47. Which is a measure that represents variability rather than central tendency?
a. Mean
b. Median
c. Standard Deviation
d. Mode

ANSWER: c

48. True/False: The sample mean is calculated by adding all the values in a dataset and dividing by the number of values.

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a. True
b. False

ANSWER: True

49. If a dataset consists of the values 2, 4, 6, and 8, what is the sample mean?
a. 4
b. 5
c. 6
d. 7

ANSWER: b

50. Which formula correctly represents the calculation of the sample mean?
a. $\Sigma x / n$
b. $n / \Sigma x$
c. $n.x / \Sigma$
d. Σn

ANSWER: a

51. True/False: The sample median is the middle value of a dataset when the values are arranged in ascending order.
a. True
b. False

ANSWER: True

52. What is the sample median of the dataset: 3, 5, 1, 4, 2?
a. 2
b. 3
c. 4
d. 5

ANSWER: b

53. Which dataset has a median of 5?
a. 1, 2, 3, 4, 5
b. 4, 5, 6, 7, 8
c. 1, 7, 5, 2, 6
d. 3, 5, 7, 9

ANSWER: c

54. True/False: The sample mean is less affected by outliers compared to the sample median.
a. True
b. False

ANSWER: False

55. Which statement best describes the difference between mean and median?
a. The mean is typically higher than the median in skewed distributions.

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b. The mean is the average, while the median is the middle value.
c. The mean and median can be equal in symmetric distributions.
d. The median gives more weight to extreme values than the mean.

ANSWER: b

56. In which situation would the sample mean be significantly different from the sample median?
a. A normal distribution
b. A skewed distribution
c. A uniform distribution
d. A bimodal distribution

ANSWER: b

57. True/False: A trimmed mean is calculated by removing the top and bottom percentages of data points before averaging.
a. True
b. False

ANSWER: True

58. If you trim 10% from both ends of a dataset, what is the purpose of this action?
a. To increase the mean
b. To reduce the effect of outliers
c. To simplify the dataset
d. To find the median

ANSWER: b

59. Which of the following datasets would benefit most from calculating a trimmed mean?
a. 1, 2, 3, 4, 5
b. 1, 1, 1, 1, 1
c. 100, 2, 3, 4, 5
d. 10, 20, 30, 40, 50

ANSWER: c

60. True/False: The sample proportion is found by dividing the number of successes by the total sample size.
a. True
b. False

ANSWER: True

61. A survey of 100 people reveals varying preferences for beverages. If 30 people prefer tea over coffee, which statement accurately describes the sample proportion of tea drinkers?
a. The sample proportion of tea drinkers is greater than one-third of the total respondents.
b. The sample proportion of tea drinkers is equal to half of the total respondents.
c. The sample proportion of tea drinkers is less than a quarter of the total respondents.
d. The sample proportion of tea drinkers is exactly three-quarters of the total respondents.

ANSWER: a

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62. In a dataset where 25 out of 200 responses are positive, what is the sample proportion of positive responses?
    a. 0.125
    b. 0.15
    c. 0.2
    d. 0.25

ANSWER: a

63. True/False: The range is the only measure of variation needed to understand a dataset's variability.
    a. True
    b. False

ANSWER: False

64. Which measure indicates how spread out the values in a dataset are?
    a. Median
    b. Mode
    c. Variance
    d. Frequency

ANSWER: c

65. What is the primary purpose of calculating the standard deviation?
    a. To determine the average value of the dataset
    b. To measure the spread of data points around the mean
    c. To find the minimum value in the dataset
    d. To identify the median

ANSWER: b

66. True/False: A higher standard deviation than variance indicates that the data points are clustered closely around the mean, suggesting low variability within the dataset.
    a. True
    b. False

ANSWER: False

67. Which of the following formulas represents the calculation of variance for a sample?
    a. $\sum(xi-\bar{x}) / n$
    b. $\sum(xi-\bar{x})2 / n$-1
    c. $\sum(xi-\bar{x})2 / n$
    d. $\sum xi-x$

ANSWER: b

68. What does a standard deviation of zero signify about a dataset?
    a. All data points are unique.
    b. All data points are the same.
    c. The dataset has a wide range.
    d. The dataset is normally distributed.

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ANSWER: b

69. True/False: Understanding that the range is calculated by subtracting the minimum value from the maximum value helps us interpret the spread of a dataset, indicating how much variability exists between the highest and lowest values.
    a. True
    b. False

ANSWER: True

70. Which best describes how to calculate the interquartile range (IQR) for a dataset?
    a. Subtract the lowest value from the highest value.
    b. Identify the difference between the first quartile (Q1) and the third quartile (Q3).
    c. Calculate the average of the dataset.
    d. Add all the values in the dataset together.

ANSWER: b

71. If a dataset has a range of 20, what does that indicate?
    a. There are 20 data points.
    b. The difference between the maximum and minimum values is 20.
    c. The average value of the dataset is 20.
    d. The dataset is normally distributed.

ANSWER: b

72. True/False: A boxplot displays the mean and mode of a dataset.
    a. True
    b. False

ANSWER: False

73. What do the whiskers in a boxplot represent?
    a. The range of the data
    b. The median of the data
    c. The interquartile range
    d. The maximum and minimum values

ANSWER: d

74. What does the length of the box in a boxplot indicate about a dataset?
    a. The average value of the dataset
    b. The degree of variability within the interquartile range
    c. The total number of data points represented in the boxplot
    d. The presence and number of outliers in the dataset

ANSWER: b

75. True/False: An outlier is defined as a data point that falls within the interquartile range (IQR).
    a. True
    b. False

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ANSWER: False

76. In a boxplot, what indicates a potential outlier?
    a. A data point within the whiskers
    b. A data point outside of the whiskers
    c. The median line
    d. The box itself

ANSWER: b

77. What is the purpose of the five-number summary?
    a. To calculate the mean and mode of a dataset
    b. To provide a quick summary of a dataset's distribution
    c. To display all individual data points
    d. To identify the most frequently occurring value

ANSWER: b

78. True/False: Comparative boxplots can be used to compare multiple datasets.
    a. True
    b. False

ANSWER: True

79. What is a key advantage of using comparative boxplots?
    a. They provide a detailed summary of individual data points for each dataset.
    b. They allow for visual comparison of the spread and central tendency of multiple datasets.
    c. They calculate and display the median of each dataset.
    d. They highlight trends in the data over time for each dataset.

ANSWER: b

80. When comparing two boxplots, what can you infer if one boxplot is significantly higher than the other?
    a. The dataset with the higher boxplot has a greater average value than the other dataset.
    b. The higher boxplot indicates that the distribution of the dataset is more variable.
    c. The dataset with the lower boxplot contains outliers that affect its overall position.
    d. The two datasets have identical ranges despite the difference in central tendency.

ANSWER: a

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