Chapter 1

Statistics, Data, and Statistical Thinking

Multiple Choice Questions

1. Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of it's students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the population of interest to the university administration.

   a. The 250 students that data was collected from.
   b. The entire set of students that park at the university.
   c. The entire set of faculty, staff, and students that park at the university.
   d. The students that park at the university between 9 and 10 AM on Wednesdays.

2. Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of it's students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the variable of interest to the university administration.

   a. Type of student (graduate or undergraduate)
   b. Age of student
   c. Parking time of student
   d. Type of car (import or domestic)
   e. Sex of student (male or female)

3. Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of it's students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the data collection method used by the administration in this study.

   a. Data from a published source
   b. Data from a designed experiment
   c. Data from a survey
   d. Data collected observationally

4. The amount of television viewed by today's youth is of primary concern to Parents Against Watching Television (PAWT). 300 parents of elementary school-aged children were asked to estimate the number of hours per week that their child watched television. The mean and the standard deviation for their responses were 15 and 5, respectively. Identify the type of data collected by PAWT.

   a. Quantitative
   b. Qualitative

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6. A manufacturer of cellular phones has decided that an assembly line is operating satisfactorily if less than 3% of the phones produced per day are defective. To check the quality of a day's production, the company decides to randomly sample 30 phones from a day's production to test for defects. Define the population of interest to the manufacturer.

a. All the phones produced during the day in question.
b. The 30 phones sampled and tested.
c. The 30 responses: defective or not defective.
d. The 3% of the phones that are defective.

7. The legal profession conducted a study to determine the percentage of cardiologists who had been sued for malpractice in the last five years. The sample was randomly chosen from a national directory of doctors. What is the variable of interest in this study?

a. The doctor's area of expertise (i.e., cardiology, pediatrics, etc.).
b. The number of doctors who are cardiologists.
c. The responses: have been sued/have not been sued for malpractice in the last five years of the cardiologists.
d. All cardiologists in the directory.

8. A published report recently stated "Based on a sample of 150 new cars, there is evidence to indicate that the average new car price of all foreign automobiles is significantly higher than the average new car price of all American cars." This statement is an example of a(n) _____.

a. random sample
b. statistical inference
c. population
d. descriptive statistic

9. A sample of high school teenagers reported that 85% of those sampled are interested in pursuing a college education. This statement is a result of a(n) _____.

a. quantitative variable
b. designed experiment
c. descriptive statistic
d. inferential statement

10. A statistics student researched her statistics project in the library and found a reference book that contained the median family incomes for all 50 states. On her project, she would report her data as being collected using _____.

a. a designed experiment
b. observational data
c. a random sample
d. a published source

11. A personnel director at a large company studied the eating habits of the company's employees. The director noted whether an employee brought their own lunch to work, ate at the company cafeteria, or went out to eat lunch. The goal of the study was to improve the company cafeteria. This type of data collection would best be considered as a(n) _____.

a. observational study
b. designed experiment
c. random sample
d. survey sample

12. Which of the following is not an element of descriptive statistical problems?

a. An inference made about the population based on the sample.
b. The population or sample of interest.
c. Tables, graphs, or numerical summary tools.
d. Identification of patterns in the data.

13. Which of the following is not an element of inferential statistical problems?

a. The population of interest.
b. Identification of patterns in the data.
c. One or more variables that are to be investigated.
d. A measure of reliability for an inference made about the population.

14-16 A study published in 1990 attempted to estimate the proportion of Florida residents who were willing to spend more tax dollars on protecting the Florida beaches from environmental disasters. Twenty-five hundred Florida residents were surveyed.

14. Which of the following is the population used in the study?

a. The 2500 Florida residents surveyed.
b. The Florida residents who were willing to spend more tax dollars on protecting the beaches from environmental disasters.
c. All Florida residents who lived along the beaches.
d. All Florida residents.

15. Which of the following describes the variable of interest in the study?

a. The response to the question "Do you live along the beach?"
b. The response to the question "Do you use the beach?"
c. The 2500 Florida residents surveyed.
d. The response to the question, "Are you willing to spend more tax dollars on protecting the Florida beaches from environmental disasters?"

16. What type of data collection procedure was most likely used to collect the data for this study?

a. A designed experiment.
b. A published source.
c. A random sample.
d. Observational data.

True-False Questions

For Question 17, answer A-True or B-False

17. When we take the information contained in the sample and make statements or predictions about all of the information in the population, we are utilizing the technique that is known as inferential statistics.

Essay Questions

1. Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of it's students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the population, sample, and variable of interest to the administrators.

2. A manatee researcher studied 57 manatees in an attempt to estimate the average age of manatees. His study indicated that the average age of manatees has decreased from five years ago, indicating an increase in the manatee population. Describe the variable of interest to the researcher.

3. A high school guidance counselor analyzed the data from a sample of 500 community colleges collected from throughout the United States. One of his goals was to estimate the annual tuition costs of community colleges in the United States. Describe the population and variable of interest to the guidance counselor.

4. A survey of 1,000 high school students indicated that 25% of those surveyed smoke cigarettes at least once a day. Give an example of a descriptive statement and an inferential statement that could be made based on this information.

Answers

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Multiple Choice Answers

1.	b	9.	c
2.	c	10.	d
3.	d	11.	a
4.	a	12.	a
5.	c	13.	b
6.	a	14.	d
7.	c	15.	d
8.	b	16.	c

True-False Answers

17. A

Essay Answers

1. The population of interest is the parking times for all students at the university that park. The sample is the parking times of the 250 students that was collected by the university administrator. The variable of interest to the administrators is the parking time variable.

2. The variable of interest to the researcher is the age of the manatee.

3. The population of interest to the guidance counselor is all community colleges in the United States.

   The variable of interest is the annual tuition cost of the community college.

4. Descriptive: 25% of the students sampled (or 250) smoke cigarettes at least once a day.

   Inferential: Based on the survey, we estimate that at least 20% of all high school students smoke cigarettes at least once a day.

   Note: The inference above becomes more meaningful when a measure of reliability is attached to it.