

Chapter 1—What is statistics?

MULTIPLE CHOICE

1. A politician who is running for the office of premier in a state with 1 million registered voters commissions a survey. In the survey, 52% of the 3000 registered voters interviewed say they plan to vote for her. The sample is the:

A	1 million registered voters in the state.
B	52 % of, or 1560, voters interviewed who plan to vote for her.
C	3000 registered voters interviewed.
D	48% of, or 1440, voters interviewed who plan not to vote for her.

ANS: C PTS: 1 DIF: Easy TOP: Key statistical concepts

2. A summary measure that is computed from a sample to describe a characteristic of the population is called:

A	a parameter.
B	a statistic.
C	a population.
D	None of these choices are correct.

ANS: B PTS: 1 DIF: Easy TOP: Key statistical concepts

3. A summary measure that is computed from a population is called:

A	a parameter.
B	a statistic.
C	a sample.
D	All of these choices are correct.

ANS: A PTS: 1 DIF: Easy TOP: Key statistical concepts

4. Descriptive statistics deals with methods of:

A	organising data.
B	summarising data.
C	presenting data in a convenient and informative way.
D	All of these choices are correct.

ANS: D PTS: 1 DIF: Easy TOP: Key statistical concepts

5. Which of the following statements is true?

A	Descriptive statistics never uses graphical techniques.
B	Descriptive statistics never uses numerical techniques.
C	Statistical inference is used to describe a sample of data.
D	Statistical inference is used to draw conclusions about characteristics of populations based on sample data.

ANS: D PTS: 1 DIF: Moderate TOP: Key statistical concepts

6. Which of the following best describes the data that is collected in a statistical study for only a portion or subset of all elements of interest?

A	A census.
B	A parameter.
C	A population.
D	A sample.

ANS: D PTS: 1 DIF: Moderate TOP: Key statistical concepts

7. You ask five of your classmates about their height. On the basis of this information, you state that the average height of the students in the sample is 170 cm. Which of the following is this an example of?

A	Descriptive statistics.
B	Inferential statistics.
C	A census.
D	A population parameter.

ANS: A PTS: 1 DIF: Moderate TOP: Key statistical concepts

8. Which of the following is the goal of descriptive statistics?

A	To summarise data.
B	To display aspects of the collected data.
C	To summarise data and display aspects of the collected data.
D	To estimate characteristics of the population.

ANS: C PTS: 1 DIF: Moderate TOP: Key statistical concepts

TRUE/FALSE

1. 25% of a random sample of 300 professional golfers indicate that their parents did not play golf. Based on this sample, we estimate that 25% of the parents of all professional golfers do not play golf. This is an example of statistical inference.

ANS: T PTS: 1 DIF: Moderate TOP: Key statistical concepts

2. A local cable TV system using a sample of 500 subscribers finds that 40% of these subscribers watch a premium channel at least once per day. This is an example of statistical inference as opposed to descriptive statistics.

ANS: F PTS: 1 DIF: Moderate TOP: Key statistical concepts

3. A summary measure that is computed from a population is called a population parameter.

ANS: T PTS: 1 DIF: Easy TOP: Key statistical concepts

4. A summary measure that is computed from a sample to describe a characteristic of the population is called a statistic.

ANS: T PTS: 1 DIF: Moderate TOP: Key statistical concepts

5. The significance level is the relative frequency of a wrong conclusion.

ANS: T PTS: 1 DIF: Difficult TOP: Key statistical concepts

6. Statistical inference is the process of making an estimate, prediction or decision about a population, based on sample data.

ANS: T

PTS: 1

DIF: Moderate

TOP: Key statistical concepts

SHORT ANSWER

1. Define each of the following statistical terms:
- Descriptive statistics.
 - Statistical inference.
 - Population.
 - Sample.
 - Parameter.
 - Statistic.

ANS:

- Descriptive statistics deals with methods of organising, summarising and presenting data in a convenient and informative way.
- Statistical inference is the process of making an estimate, prediction or decision about a population parameter, based on sample data.
- A population is the group of all items of interest to a statistics practitioner. It is frequently very large and may, in fact, be infinitely large.
- A sample is a set of data drawn from the population.
- A parameter is a summary measure that is computed from a population.
- A statistic is a summary measure that is computed from a sample to describe the corresponding characteristic of the population.

PTS: 1

DIF: Easy

TOP: Key statistical concepts

2. A manufacturer of televisions claims that fewer than 3% of their products are defective. When 100 televisions were drawn from a large production run, 10% were found to be defective.
- What is the population of interest?
 - What is the sample?
 - What is the parameter?
 - What is the statistic?
 - Does the value of 3% refer to the parameter or the statistic?
 - Is the value of 10% a parameter or a statistic?
 - Explain briefly how the statistic can be used to make inferences about the parameter to test the claim.

ANS:

- The complete production run.
- The 100 televisions.
- The proportion of the production run that is defective.
- The proportion of the sample televisions that is defective.
- Parameter.
- Statistic.
- Because the sample proportion is more than 3%, we conclude that the data does not support the claim.

PTS: 1

DIF: Moderate

TOP: Key statistical concepts

3. A businessman who is running for a vacant city council seat with 20 000 registered voters conducts a survey. In the survey, 200 of the 300 registered voters interviewed say they plan to vote for him.
- What proportion of the respondents plans to vote for this businessman?
 - What is the population of interest?
 - What is the sample?
 - Is your answer in part (a) above a parameter or a statistic?

ANS:

- $200/300=0.666$, i.e. 66.6%.
- The political choices of the 20 000 registered voters in the given constituency.
- The political choices of the 300 registered voters in the survey.
- Statistic.

PTS: 1 DIF: Moderate TOP: Key statistical concepts

4. Consider the population of all pencil manufacturers in the world. Describe any four examples of possible samples that could be taken from this population.

ANS:

- Manufacturers of wooden pencils.
- Manufacturers of colour pencils.
- Manufacturers of graphite pencils.
- Australian manufacturers of pencils.

PTS: 1 DIF: Easy TOP: Key statistical concepts

5. Identify each of the following studies as using either descriptive statistics or inferential statistics.
- Calculating the relative frequency of Holden Commodore SV6 cars passing by your house between 7pm and 8pm this evening.
 - Estimating the proportion of households in Melbourne that have at least two dependents, from a random sample of 100 Melbournian households.
 - Measuring the fuel efficiency of five brand new Holden Commodore SV6 cars in order to find out whether the average fuel consumption of this make and model is better than 10L/100km.
 - Calculating the proportion of female students in a business statistics class.
 - Estimating the average age of students at La Trobe University from a sample of 200 randomly selected students.

ANS:

- Descriptive statistics.
- Inferential statistics.
- Inferential statistics.
- Descriptive statistics.
- Inferential statistics.

PTS: 1 DIF: Moderate TOP: Key statistical concepts