

3.1 Introducing Statistics: Do the Data We Collected Tell the Truth?

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

KEY WORDS bias 偏差 • population 总体 • generalization 推广 • sample 样本 • systematic 系统

Objective

Build the skills to answer exam questions on **whether the data tell the truth**.

You must be able to:

- explain how the **method** of data collection affects the conclusions
- recognise sources of **bias** 偏差 that make data unrepresentative
- distinguish data that support a **generalization** 推广 from data that do not

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ **The method matters**

How data are collected shapes what conclusions are valid. A flawed method can make even a large data set useless.

■ **Bias**

Bias systematically makes a sample **unrepresentative** of the population, so conclusions are distorted.

■ **Generalizing**

Only data from a well-chosen (ideally random) sample can be **generalized** to the whole population.

2 Practice

2.1 State how the method of data collection affects conclusions. [1]

2.2 Define bias in data collection. [1]

2.3 State what kind of sample allows generalization to a population. [1]

3 Exam-style questions

3.1 Biased data are [1]

- **A** always accurate
- **B** unrepresentative of the population
- **C** very large
- **D** perfectly random

3.2 The way data are collected affects [1]

- **A** the population size
- **B** the conclusions we can draw
- **C** the mean only
- **D** nothing at all

3.3 A poll surveys only people at a gym about their exercise habits.

(a) State whether the sample is representative of all adults. [1]

(b) Name the problem. [1]

(c) State whether the results can generalize to all adults. [1]

Solutions

2.1 a poor method can make the data unrepresentative, so the conclusions are invalid.

2.2 a systematic tendency for a sample to misrepresent the population.

2.3 a random (representative) sample.

3.1 B.

3.2 B.

3.3 (a) no. (b) bias (undercoverage — gym-goers are not typical). (c) no.