

3.7 Inference and Experiments

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

KEY WORDS statistically significant 统计显著 • random assignment 随机分配
• random selection 随机选取 • experiment 实验 • population 总体

Objective

Build the skills to answer exam questions on **inference and experiments**.

You must be able to:

- explain that **random assignment** 随机分配 allows a **cause-and-effect** conclusion
- explain that **random selection** 随机选取 allows **generalization** to a population
- describe when a difference is **statistically significant** 统计显著

1 Worked examples

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

■ Two kinds of randomness

- **Random assignment** of units to treatments lets you conclude **cause and effect**.
- **Random selection** of units from a population lets you **generalize** the results to that population.

■ Statistical significance

A difference between groups is **statistically significant** when it is **too large to be explained by chance alone**.

2 Practice

2.1 State what random assignment allows you to conclude. [1]

2.2 State what random selection allows. [1]

2.3 Define a statistically significant difference. [1]

3 Exam-style questions

3.1 Random assignment to treatments allows a conclusion about [1]

- **A** generalization
- **B** cause and effect
- **C** the population size
- **D** bias

3.2 A result is statistically significant if it is [1]

- **A** small
- **B** unlikely to be due to chance alone
- **C** biased
- **D** perfectly random

3.3 An experiment randomly assigns treatments and finds a large difference between the groups.

(a) State what random assignment allows. [1]

(b) State what random selection of units would allow. [1]

(c) State what “statistically significant” means. [1]

Solutions

2.1 a cause-and-effect relationship.

2.2 generalizing the results to the population.

2.3 a difference too large to be explained by chance alone.

3.1 B.

3.2 B.

3.3 (a) a cause-and-effect conclusion. (b) generalizing to the population. (c) the difference is unlikely to be due to chance alone.