

8.1 Introducing Statistics: Are My Results Unexpected?

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

KEY WORDS chi-square 卡方 • expected counts 期望计数 • observed counts 观测计数

Objective

Build the skills to answer exam questions on **whether results are unexpected**.

You must be able to:

- explain that a **chi-square** 卡方 test compares **observed** counts to **expected** counts
- describe **observed counts** 观测计数 and **expected counts** 期望计数
- recognise that chi-square tests are for **categorical** data

1 Worked examples

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

■ Chi-square tests

A **chi-square** test judges whether **observed** counts differ from what we would **expect** if a claim were true.

- **Observed counts** — what the data actually show in each category.
- **Expected counts** — what we would predict under the null hypothesis.

Large gaps between observed and expected point to a real effect. Chi-square tests are used for **categorical** data (counts).

■ A worked comparison

A die is rolled 60 times. If it is fair, each face is **expected** 10 times. Suppose a six is **observed** 18 times: the gap ($18 - 10$) is large, hinting the die is not fair. Chi-square adds up these gaps across all six faces to give one number.

2 Practice

2.1 State what a chi-square test compares. [1]

2.2 State what “observed counts” are. [1]

2.3 State what “expected counts” are. [1]

3 Exam-style questions

3.1 A chi-square test compares observed counts to [1]

A	B
C	D

- A means
B expected counts
C slopes
D proportions directly

3.2 Chi-square tests are used for _____ data. [1]

A	B
C	D

- A quantitative
B categorical
C continuous
D paired

3.3 A die is rolled 60 times to test whether it is fair.

(a) Name the kind of data collected. [1]

(b) State the expected count for each face. [1]

(c) Name the test comparing observed to expected counts. [1]