AP STATISTICS • EXERCISE SHEET

8.7 Skills Focus: Selecting an Appropriate Inference Procedure for Categorical Data

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

Objective

Build the skills to answer exam questions on **selecting a categorical inference procedure**.

You must be able to:

- choose a **goodness-of-fit** test, a test of **homogeneity**, or a test of **independence**
- distinguish these chi-square procedures from a one- or two-proportion procedure

1 Worked examples

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

■ **Which categorical procedure?**

- **Goodness of fit** —does **one** categorical variable match a claimed distribution?
- **Homogeneity** —is the distribution of one variable the **same across several groups**?
- **Independence** —are **two** categorical variables associated in **one** sample?
- **One/two proportion** —for a single proportion or the difference of two proportions (a two-category variable).

■ **Worked choices**

"Does this die match a uniform distribution?" – one variable versus a claim → **goodness of fit**. "Do three schools have the same grade distribution?" – one variable across groups → **homogeneity**. "Are gender and subject choice associated in one sample?" – two variables, one sample → **independence**.

2 Practice

2.1 State when to use a goodness-of-fit test. [1]

2.2 State when to use a test of independence. [1]

2.3 State the difference between a two-proportion test and a chi-square test of homogeneity. [1]

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3 Exam-style questions

3.1 To test whether one categorical variable's distribution matches claimed proportions, use [1]

- **A** a t-test
- **B** a goodness-of-fit test
- **C** regression
- **D** a z-interval

3.2 To test the association between two categorical variables in one sample, use [1]

- **A** a goodness-of-fit test
- **B** a test of independence
- **C** a mean test
- **D** a slope test

3.3 A researcher compares the distribution of blood types across 3 hospitals.

(a) Name the type of data. [1]

(b) Name a suitable chi-square test. [1]

(c) State the degrees-of-freedom formula for the table. [1]

4 Go further

- work through the **8.7 Selecting an Appropriate Inference Procedure for Categorical Data** lesson on the **Learn** page;
- read the **Inference for Categorical Data: Chi-Square** section of the AP Statistics handout on the **Know** page.

Solutions

2.1 when checking whether one categorical variable matches a claimed distribution.

2.2 when testing whether two categorical variables are associated in one sample.

2.3 a two-proportion test compares two groups on a two-category variable; homogeneity compares a variable with more than two categories across groups.

3.1 B.

3.2 B.

3.3 (a) categorical (counts). (b) a chi-square test of homogeneity. (c) $(r-1)(c-1)$.