AP STATISTICS • EXERCISE SHEET

2.2 Representing Two Categorical Variables

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **representing two categorical variables**.

You must be able to:

- organise two categorical variables in a **two-way table** 双向表
- calculate **joint** 联合, **marginal** 边缘, and **conditional** 条件 relative frequencies
- display the relationship with a **segmented** or **side-by-side bar chart**

1 Worked examples

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

■ Three kinds of relative frequency

From a two-way table with grand total N:

- **Joint** —one cell $\div N$.
- **Marginal** —a row or column total $\div N$.
- **Conditional** —a cell $\div$ its **row (or column)** total.

■ Displaying it

A **segmented (stacked)** or **side-by-side** bar chart shows how the categories of one variable break down by the other.

2 Practice

2.1 Define a joint relative frequency. [1]

2.2 Define a marginal relative frequency. [1]

2.3 In a survey of 50 people, 20 are "young and answered yes". Find the joint relative

frequency. [2]

3 Exam-style questions

3.1 A conditional relative frequency is a proportion within [1]

- **A** the whole table
- **B** one row or one column
- **C** a single cell only
- **D** no group

3.2 A row or column total divided by the grand total is a _____ relative frequency. [1]

- **A** joint
- **B** marginal
- **C** conditional
- **D** none of these

3.3 Of 80 students, 24 are ”sporty and pass”.

(a) Find the joint relative frequency of ”sporty and pass”. [2]

(b) Name a chart that displays two categorical variables. [1]

4 Go further

- work through the **2.2 Representing Two Categorical Variables** lesson on the **Learn** page;
- read the **Exploring Two-Variable Data** section of the AP Statistics handout on the **Know** page.

Solutions

2.1 the proportion of the whole in one cell (one combination of categories).

2.2 the proportion of the whole in one category (a row or column total over the grand total).

2.3 $\dfrac{20}{50} = 0.40$.

3.1 B.

3.2 B.

3.3 (a) $\dfrac{24}{80} = 0.30$. (b) a segmented or side-by-side bar chart.