AP STATISTICS • EXERCISE SHEET

4.4 Mutually Exclusive Events

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

Objective

Build the skills to answer exam questions on **mutually exclusive events**.

You must be able to:

- describe the **joint probability** 联合概率 $P(A \cap B)$
- explain why two events are or are not **mutually exclusive** 互斥
- use that mutually exclusive (disjoint) events have $P(A \cap B) = 0$

1 Worked examples

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

Joint probability

$P(A \cap B)$ is the probability that **both** A and B occur (the intersection).

Mutually exclusive events

Two events are **mutually exclusive** (disjoint) if they **cannot happen at the same time**, so

$$P(A \cap B) = 0.$$

For example, on one die roll, "roll a 2" and "roll a 5" are mutually exclusive.

2 Practice

2.1 State what $P(A \cap B)$ means. [1]

2.2 Define mutually exclusive events. [1]

2.3 State $P(A \cap B)$ for two mutually exclusive events. [1]

3 Exam-style questions

3.1 Two mutually exclusive events have $P(A \cap B) =$ [1]

- **A** 1
- **B** 0
- **C** 0.5
- **D** $P(A) \cdot P(B)$

3.2 $P(A \cap B)$ is called the _____ probability. [1]

- **A** conditional
- **B** joint
- **C** marginal
- **D** complement

3.3 On one die roll, event A = "roll a 3" and event B = "roll a 6".

(a) State whether A and B are mutually exclusive. [1]

(b) State $P(A \cap B)$. [1]

(c) Find $P(A)$. [1]

4 Go further

- work through the **4.4 Mutually Exclusive Events** lesson on the **Learn** page;
- read the **Probability, Random Variables, and Probability Distributions** section of the AP Statistics handout on the **Know** page.

Solutions

2.1 the probability that both A and B occur.

2.2 events that cannot occur at the same time.

2.3 0.

3.1 B.

3.2 B.

3.3 (a) yes. (b) 0. (c) $\frac{1}{6}$.