

5.3 Probability

Name: _____ Class: _____ Date: _____

Total: 13 marks

KEY WORDS probability 概率 • independent 独立 • mutually exclusive 互斥
 • conditional probability 条件概率 • independent events 独立事件

Objective

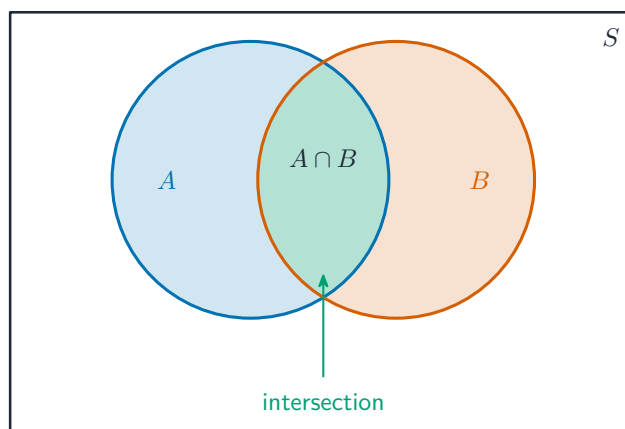
Build the skills to answer exam questions on **probability** 概率 — the addition and multiplication rules, **mutually exclusive** 互斥 and **independent** 独立 events, and **conditional probability** 条件概率.

You must be able to:

- use $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- test independence with $P(A \cap B) = P(A)P(B)$
- use $P(A | B) = \frac{P(A \cap B)}{P(B)}$

1 Worked examples

■ Rules & independence



The overlap is $A \cap B$; the addition rule subtracts it once so it is not double-counted

$P(A) = 0.5$, $P(B) = 0.4$, $P(A \cap B) = 0.2$. **Independent?** $P(A)P(B) = 0.2 = P(A \cap B)$ — yes.

Conditional: $P(A | B) = \frac{0.2}{0.4} = 0.5$.

2 Practice

2.1 Events are mutually exclusive with $P(A) = 0.3$, $P(B) = 0.45$. Find $P(A \cup B)$. [2]

2.2 State the test for two events A and B to be independent. [1]

3 Exam-style questions

3.1 For independent events with $P(A) = 0.6$ and $P(B) = 0.5$, $P(A \cap B)$ is: [1]

A	B
C	D

A 1.1

B 0.3

C 0.1

D 0

3.2 A and B are events with $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cup B) = 0.8$.

(a) Find $P(A \cap B)$. [2]

(b) Determine whether A and B are independent. [2]

(c) Find $P(A \mid B)$. [2]

3.3 A bag has 5 red and 3 blue balls. Two are drawn without replacement. Find the probability that both are red. [3]
