

E1.2 Sets

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS venn diagram 维恩图 • element 元素 • notation 符号 • sets 集合
• intersection 交集

Objective

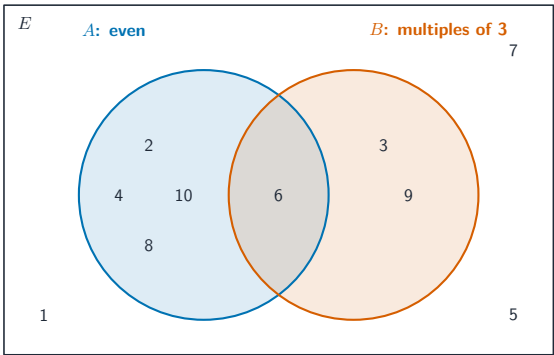
Build the skills to answer Extended exam questions on **sets** 集合 — set **notation** 符号, **Venn diagrams** 维恩图, and the **union**, **intersection** and **complement** 并集、交集、补集.

You must be able to:

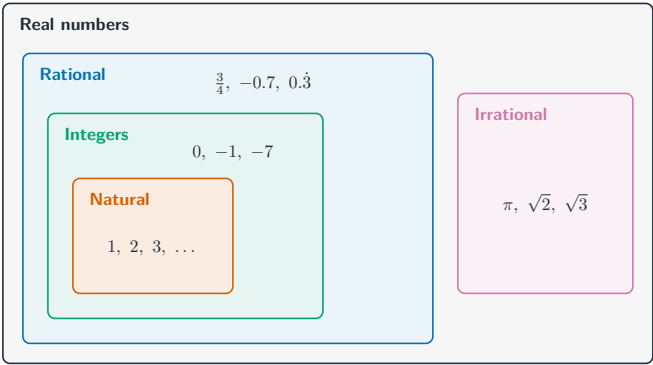
- use the symbols $\cup$, $\cap$, A' , $\in$, $n(A)$
- list elements of unions and intersections
- shade and read regions of a Venn diagram

1 Worked examples

■ Union, intersection, complement



The overlap is the intersection; everything inside either circle is the union



Number sets shown as nested regions of a Venn diagram

- $A \cup B$ **union** 并集: in A **or** B (or both). $A \cap B$ **intersection** 交集: in **both**.
- A' **complement** 补集: everything **not** in A . $n(A)$: the number of elements in A .
- **Worked:** $E = \{1-10\}$, $A = \{2, 4, 6, 8, 10\}$, $B = \{3, 6, 9\} \rightarrow A \cap B = \{6\}$, $A \cup B = \{2, 3, 4, 6, 8, 9, 10\}$, $n(A \cup B) = 7$.

Answer shapes: M1 a correct method, A1 the correct answer.

2 Practice

2.1 $E = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$. List the elements of $A \cap B$. [1]

2.2 For the same sets, list the elements of $A \cup B$. [2]

2.3 For the same sets, find $n(A')$. [2]

3 Exam-style questions

3.1 $E = \{x : 1 \leq x \leq 12, x \text{ is an integer}\}$, $P = \{\text{multiples of } 3\}$, $Q = \{\text{factors of } 12\}$.

(a) List the elements of $P \cap Q$. [2]

(b) Find $n(P \cup Q)$. [2]

3.2 On a Venn diagram with sets A and B , describe in words the region $A \cap B'$. [1]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

2.1 $A \cap B = \{2, 4\}$.

2.2 $A \cup B = \{1, 2, 3, 4, 6, 8\}$.

2.3 $A' = \{5, 6, 7, 8\}$, so $n(A') = 4$.

3.1 (a) $P = \{3, 6, 9, 12\}$, $Q = \{1, 2, 3, 4, 6, 12\} \rightarrow P \cap Q = \{3, 6, 12\}$. (b) $P \cup Q = \{1, 2, 3, 4, 6, 9, 12\} \rightarrow n(P \cup Q) = 7$.

3.2 the elements that are in A but **not** in B (the part of circle A outside the overlap).