

Exercise walk-through

Sets ■ E1.2

eXercise

You must be able to

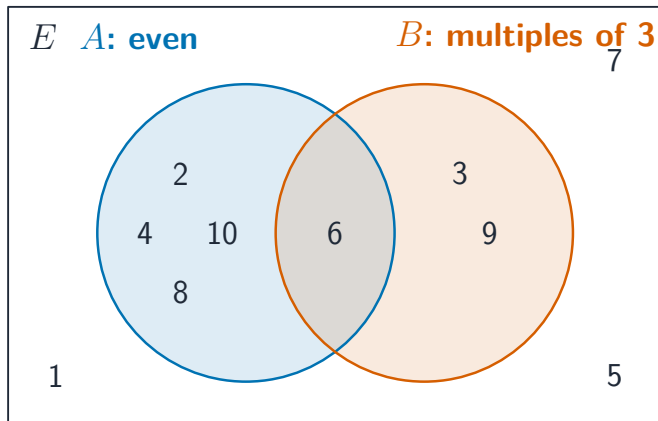
- use the symbols $\cup$, $\cap$, A' , $\in$, $n(A)$
- list elements of unions and intersections
- shade and read regions of a Venn diagram

Method — Union, intersection, complement

- $A \cup B$ **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:** $E = \{1-10\}$, $A = \{2, 4, 6, 8, 10\}$, $B = \{3, 6, 9\} \rightarrow A \cap B = \{6\}$,
 $A \cup B = \{2, 3, 4, 6, 8, 9, 10\}$, $n(A \cup B) = 7$.

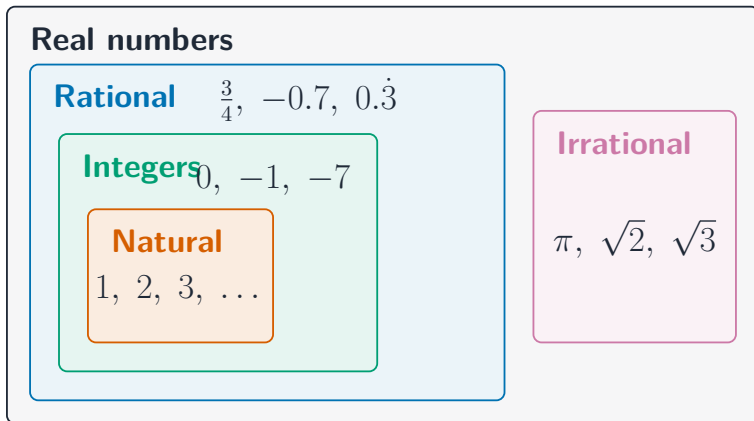
Answer shapes: **M1** a correct method, **A1** the correct answer.

Method — Union, intersection, complement



Two overlapping circles in a rectangle

Method — Union, intersection, complement



Number sets shown as nested regions of a Venn diagram

Practice 2.1 ■ 1 mark

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

Solution 2.1

Method: Union, intersection, complement

Worked steps

$$A \cap B = \{2, 4\} \text{ B1.}$$

Practice 2.2 ■ 2 marks

For the same sets, list the elements of $A \cup B$.

Solution 2.2

Method: Union, intersection, complement

Worked steps

$A \cup B = \{1, 2, 3, 4, 6, 8\}$ **M1** **A1** *for at least the four of A plus 6, 8; for the full correct list.*

Practice 2.3 ■ 2 marks

For the same sets, find $n(A')$.

Solution 2.3

Worked steps

$A' = \{5, 6, 7, 8\}$, so $n(A') = 4$ **M1** **A1** for A' ; for 4.

Exam-style 3.1 ■ 2 marks

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

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

(b) Find $n(P \cup Q)$.

Solution 3.1

Method: Union, intersection, complement

Worked steps

(a) $P = \{3, 6, 9, 12\}$, $Q = \{1, 2, 3, 4, 6, 12\} \rightarrow P \cap Q = \{3, 6, 12\}$ **M1** **A1** for both sets listed. (b) $P \cup Q = \{1, 2, 3, 4, 6, 9, 12\} \rightarrow n(P \cup Q) = 7$ **M1** **A1** for 7.

Exam-style 3.2 ■ 1 mark

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

Solution 3.2

Method: Union, intersection, complement

Worked steps

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

B1.