

Sets

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Name: _____

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At a glance

Set language and symbols, Venn diagrams with two or three sets, shading, and word problems.

1. Set notation
2. Venn diagrams and shading
3. Venn diagram problems

1. Set notation

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- Learn the symbols — questions use them without explanation.

Symbol	Meaning
ξ	the universal set (everything)
$x \in A$	x is in A
$x \notin A$	x is not in A
A'	everything not in A
$A \cup B$	in A or B or both (union)
$A \cap B$	in both A and B (intersection)
$\emptyset$	the empty set
$A \subseteq B$	A is a subset of B
$n(A)$	the number of elements in A
$\{x : x > 3\}$	the set of x such that $x > 3$

Worked example

$A = \{2, 4, 6, 8, 10\}$, $B = \{3, 6, 9\}$. Find $A \cap B$ and $n(A \cup B)$.

1. Both: 6.
2. $A \cup B = \{2, 3, 4, 6, 8, 9, 10\}$.

$A \cap B = \{6\}$; $n(A \cup B) = 7$

2. Venn diagrams and shading

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- Two sets make four regions: A only, both, B only, neither.
- $A \cap B' =$ in A but not B . $(A \cup B)' =$ outside both. $A' \cup B =$ everything except ' A only'.
- For three sets, there are eight regions; fill from the centre outwards.

Region	Notation
A only	$A \cap B'$
B only	$A' \cap B$
Both	$A \cap B$
Neither	$(A \cup B)'$ or $A' \cap B'$
Exactly one	$(A \cap B') \cup (A' \cap B)$

Describe the region 'in B but not in A or C' using set notation.

$$B \cap A' \cap C'$$
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- ## Formulas

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Don't write	Write instead
✗ $n(A \cup B) = n(A) + n(B)$	✓ Subtract the overlap
✗ Putting 32 in the 'tea only' region	✓ 32 is all of tea; tea only = 32 – both
✗ Forgetting the region outside the circles	✓ It is part of ξ — include it in the total
✗ Listing 1 as a prime in a set	✓ 1 is not prime

- Draw the Venn diagram even when not asked — it organises the information.
- Check that all the regions add up to $n(\xi)$.
- Shading questions: shade carefully and clearly; mark the region boundaries.