



EM

Sets

1) Set Notations

a) Listing the elements of a set eg: $S = \{3, 6, 9\}$ b) Describing the elements of a set eg: $S = \{x : x \text{ is a multiple of 3 less than 11}\}$

2) Symbols

Example: $\xi = \{x : x \text{ is a positive integer less than 11}\}$

$$A = \{1, 2, 3, 4, 8\}$$

$$D = \{ \}$$

$$B = \{3, 5, 8, 10\}$$

$$E = \{8, 3, 10, 5\}$$

$$C = \{9\}$$

$$F = \{3, 2, 1\}$$

Symbol	Meaning	Example	Explanation
	universal set	$\xi = \{x : x \text{ is a positive integer less than 11}\}$	Only positive integers less than 11 are being considered. $\xi =$
or	Empty set	$D =$ or $D =$	Set D contains ____ elements.
	an element of	$\in B$	____ is an element of B.
	not an element of	$\notin B$	____ is not an element of B.
$n()$	number of elements	$n(A) =$ $n(C) =$	Set A contains ____ elements. Set C contains ____ element.
	subset of	Other possible Eg: $D \subseteq B$ $D \subseteq F$ $D \subseteq C$ $\{4, 3\} \subseteq A$ $\subseteq B$ $F \subseteq$	Every element of ____ is also in ____. Every element of ____ is also in ____. *subset = smaller OR equal
	not a subset of	$E \not\subseteq A$	Not every element of ____ is in ____.
	proper subset of	Other possible Eg: $D \subset B$ $\{3\} \subset F$ $\subset A$	Every element of ____ is in ____ and ____ has at least one element that is not in ____ (i.e. $F \neq A$) *proper subset = smaller only
	not a proper subset of	$E \not\subset B$ $F \not\subset B$	E is ____ to B so E cannot be a proper subset of B. F contains ____.
	equal sets	$B = E$	B and E contain ____ elements.
	intersection	$A \cap E =$	____ are common to ____.
	union	$B \cup F =$	____ belong to ____.
	complement	$A' =$	____ belong to ____ but not to ____.
	disjoint	C and F are disjoint sets	C and F have ____ $C \cap F = \emptyset$

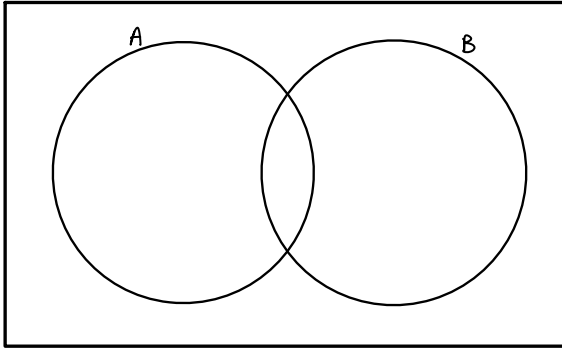
3) Venn Diagram

a) Shading Venn diagrams → use a ruler to shade!

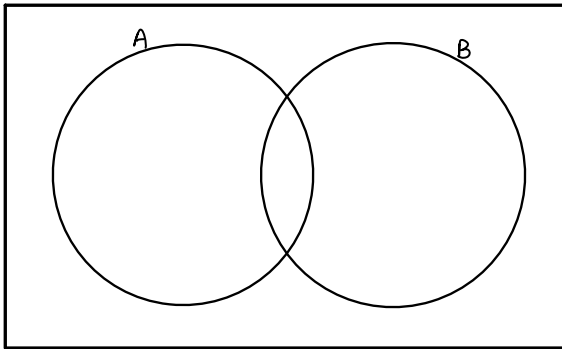
TIP Intersection: shade left, shade right, take overlap

Union: shade left, shade right.

Eg: $A' \cap B'$



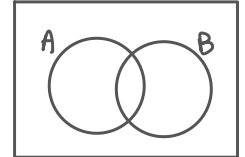
Eg: $A' \cup B'$



Steps

On a separate diagram,

① Shade A' first



② Shade B' next in another direction

③ The overlapping region is the answer. Shade in the final diagram.

Shade directly in the final diagram

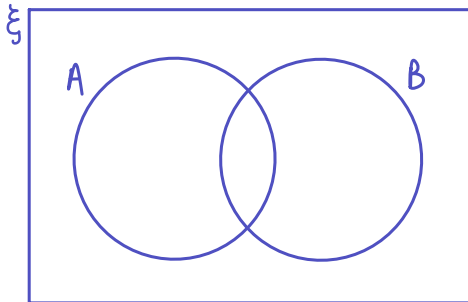
① Shade A' first

② Shade B' next

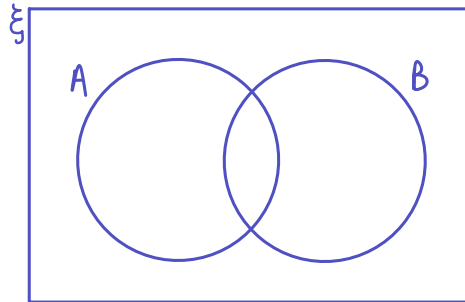
→ only the intersection is not shaded.

Examples · On the following Venn diagrams, shade the region that represents

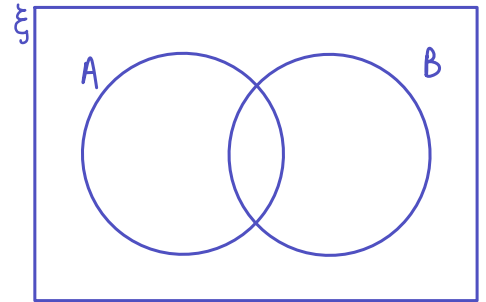
(a) $A' \cap B$



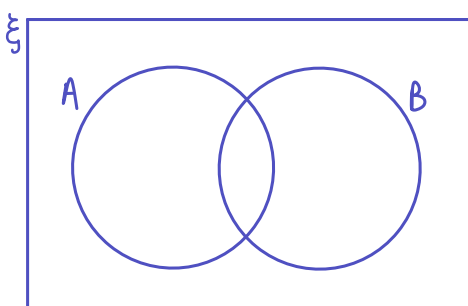
(b) $(A \cup B)'$



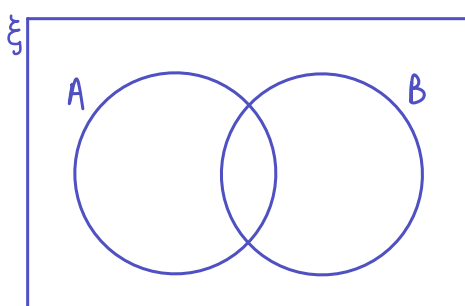
(c) $(A \cap B)'$



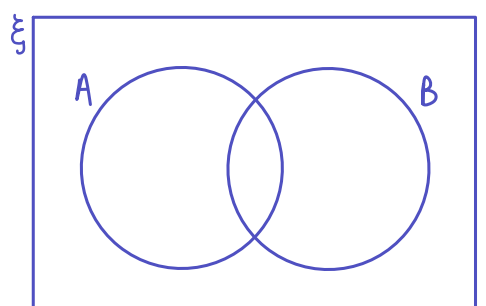
(d) $A' \cup B$



(e) $(A \cap B)' \cap B$



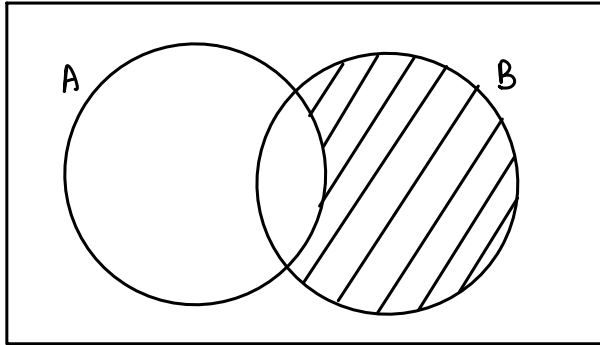
(f) $(A \cup B)' \cap (A \cup B)$



b) Describing shaded region in Venn diagrams

- 1) Is it inside or outside A? }
 2) Is it inside or outside B? }
 3) Is it 1) D 2) (VS) 1) 2) ?
 ↓ ↓
 use _____ use _____

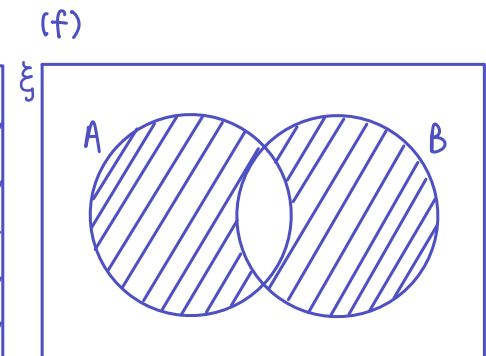
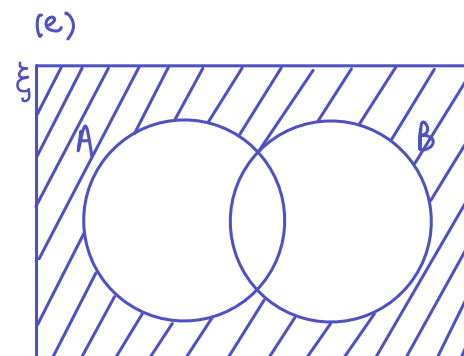
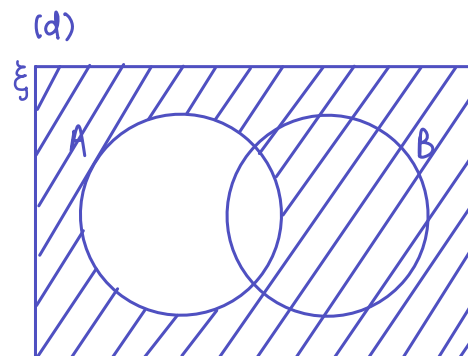
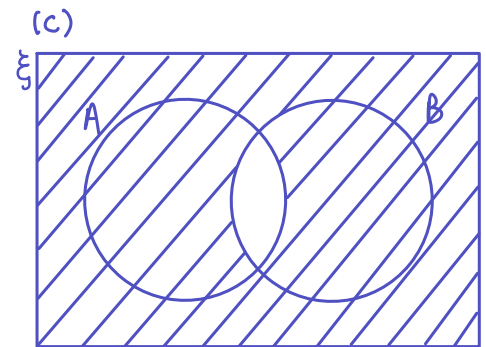
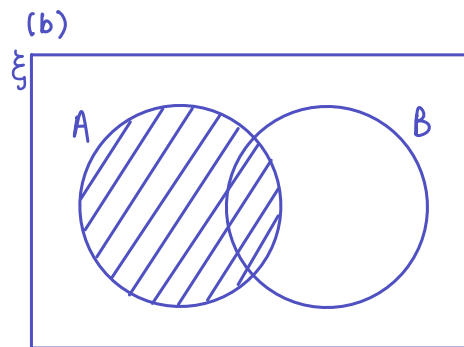
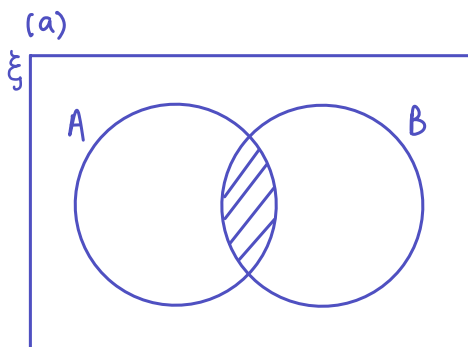
Eg:



- 1)
2)
3)

Ans :

Eg: Describe the shaded region in each of the following Venn diagrams in set notation.



c) Drawing and evaluating Venn diagrams

Example: $\xi = \{x : x \text{ is a positive integer less than } 13\}$ $A = \{x : x \text{ is a multiple of } 3\}$ $B = \{x : x \text{ is a prime number}\}$ $C = \{ \}$ 

$$A \cap B = \underline{\hspace{2cm}}$$

B and C are sets.

Example: $\xi = \{x : x \text{ is an integer between } 4 \text{ and } 12\}$ $D = \{x : x \text{ is a multiple of } 6\}$ $E = \{x : x \text{ is a composite number}\}$ $F = \{x : x \text{ is a multiple of } 5\}$ 

$$D \cap E = \underline{\hspace{2cm}}$$

$$D' \cap F' = \underline{\hspace{2cm}}$$

$$D \cap F = \underline{\hspace{2cm}}$$

$$D \cup (F \cap E) = \underline{\hspace{2cm}}$$

d) Set notation (no Venn diagram)

Eg: [Source: Jurong West Secondary School/2026/WA1/Q2]

 $\xi = \{x : x \text{ is an integer and } 1 \leq x < 10\}$ $P = \{\text{prime number}\}$ $Q = \{\text{solutions of the equation } x^2 - 7x + 12 = 0\}$

(i) List the elements in P' .

(ii) List the elements in $P' \cup Q$.

(iii) List the elements in $(P \cup Q)' \cup (P \cap Q)$.

(iv) A student said that $11 \notin P$. Do you agree? Explain your answer.