CHAPTER 1 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 _____ $C \cap B = \varnothing$

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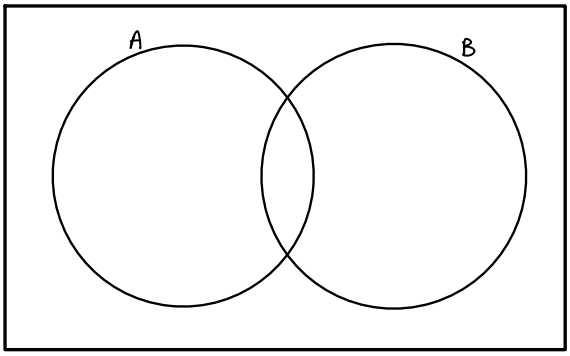
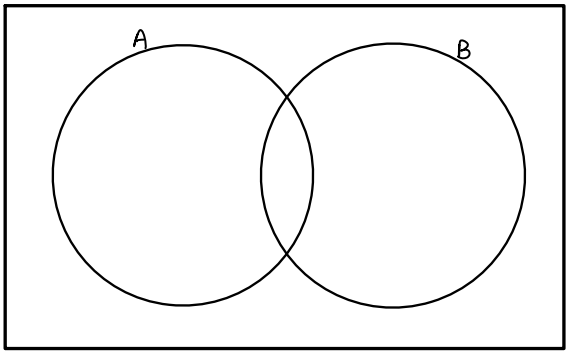
3) Venn Diagram

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

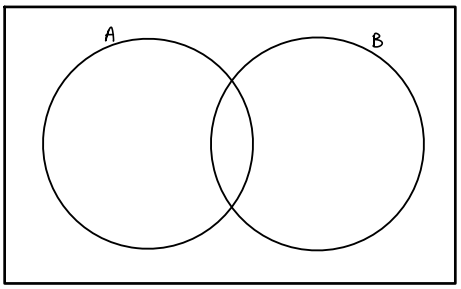
Eg: $A' \cap B'$



Eg: $A' \cup B'$



Steps



① Divide the diagram into ____ regions

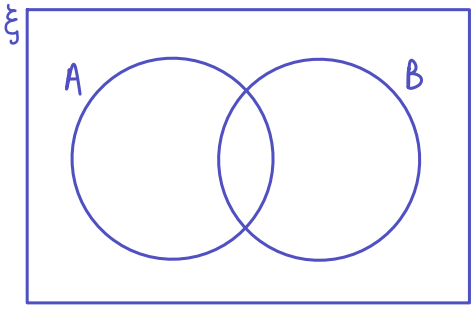
② Tick the regions for A'
↳ Regions ____ and ____

③ Tick the regions for B'
↳ Regions ____ and ____

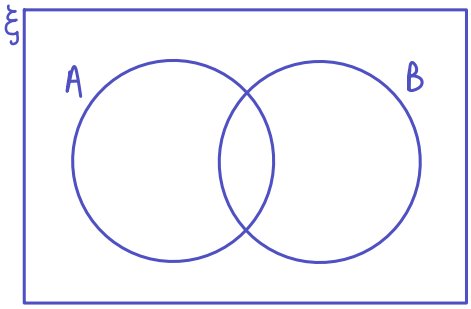
④ Intersection ($\cap$): Shade regions with _____.
Union ($\cup$): Shade regions with _____.

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

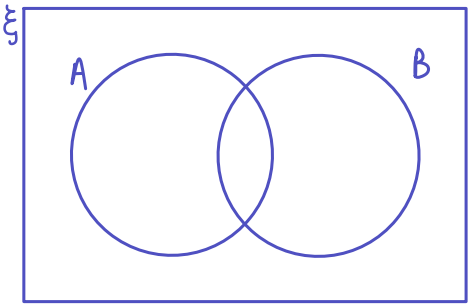
(a) $A' \cap B$



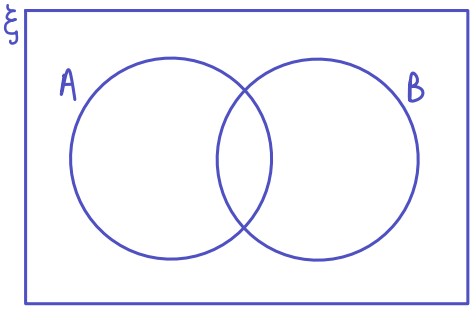
(b) $(A \cup B')'$



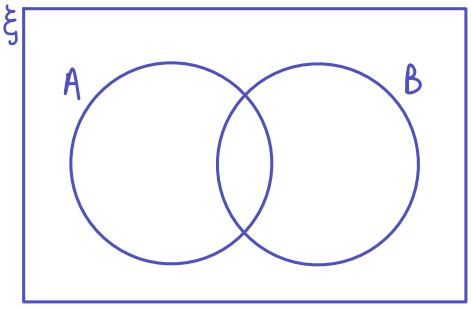
(c) $(A \cap B)'$



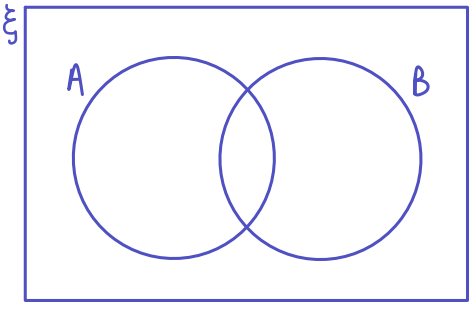
(d) $A' \cup B$



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



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



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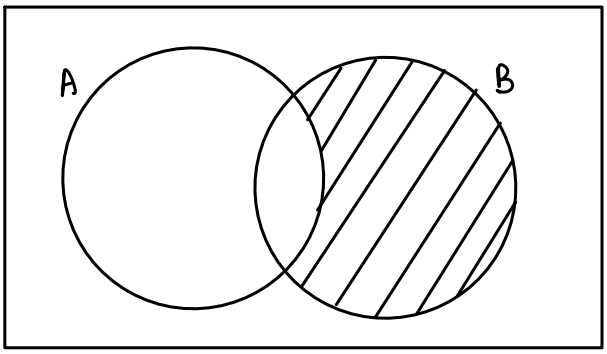
b) Describing shaded region in Venn diagrams

① Is it inside or outside A?
② Is it inside or outside B?
③ Is it ① ② VS ① ②?
use ____ use ____

Eg:

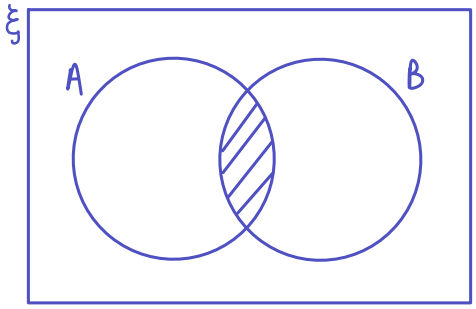


①
②
③

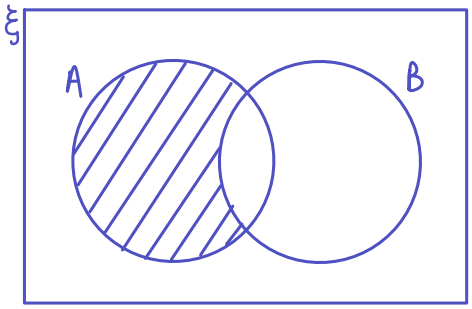
Ans :

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

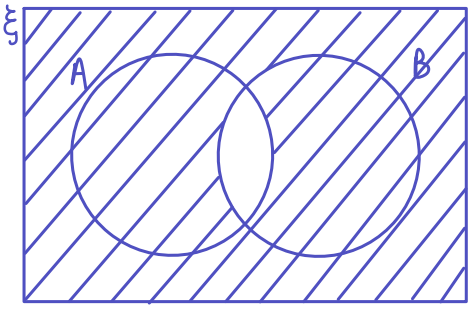
(a)



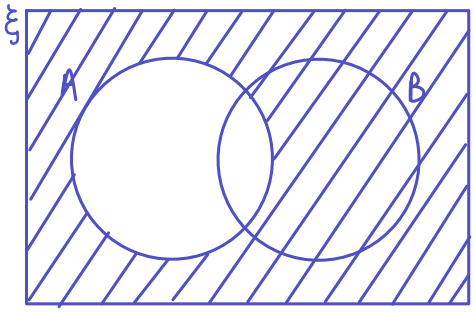
(b)



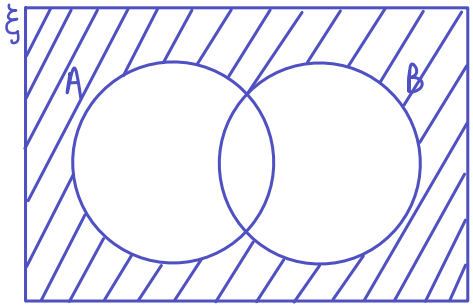
(c)



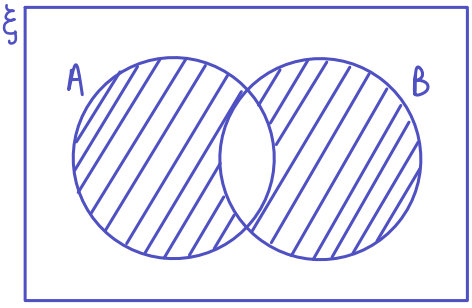
(d)



(e)



(f)



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c) Drawing and evaluating Venn diagrams

Example:

$\xi = \{x : x \text{ is a positive integer less than } 13\}$

$A = \{x : x \text{ is a multiple of } 3\}$

$B = \{x : x \text{ is a prime number}\}$

$C = \{\ \}$



$A \cap B =$ _____

B and C are _____ sets.

Example:

$\xi = \{x : x \text{ is an integer between 4 and 12}\}$

$D = \{x : x \text{ is a multiple of 6}\}$

$E = \{x : x \text{ is a composite number}\}$

$F = \{x : x \text{ is a multiple of 5}\}$



D ___ E $D' \cap F' =$ _____

11 ___ F $D \cup (F \cap E) =$ _____

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.

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