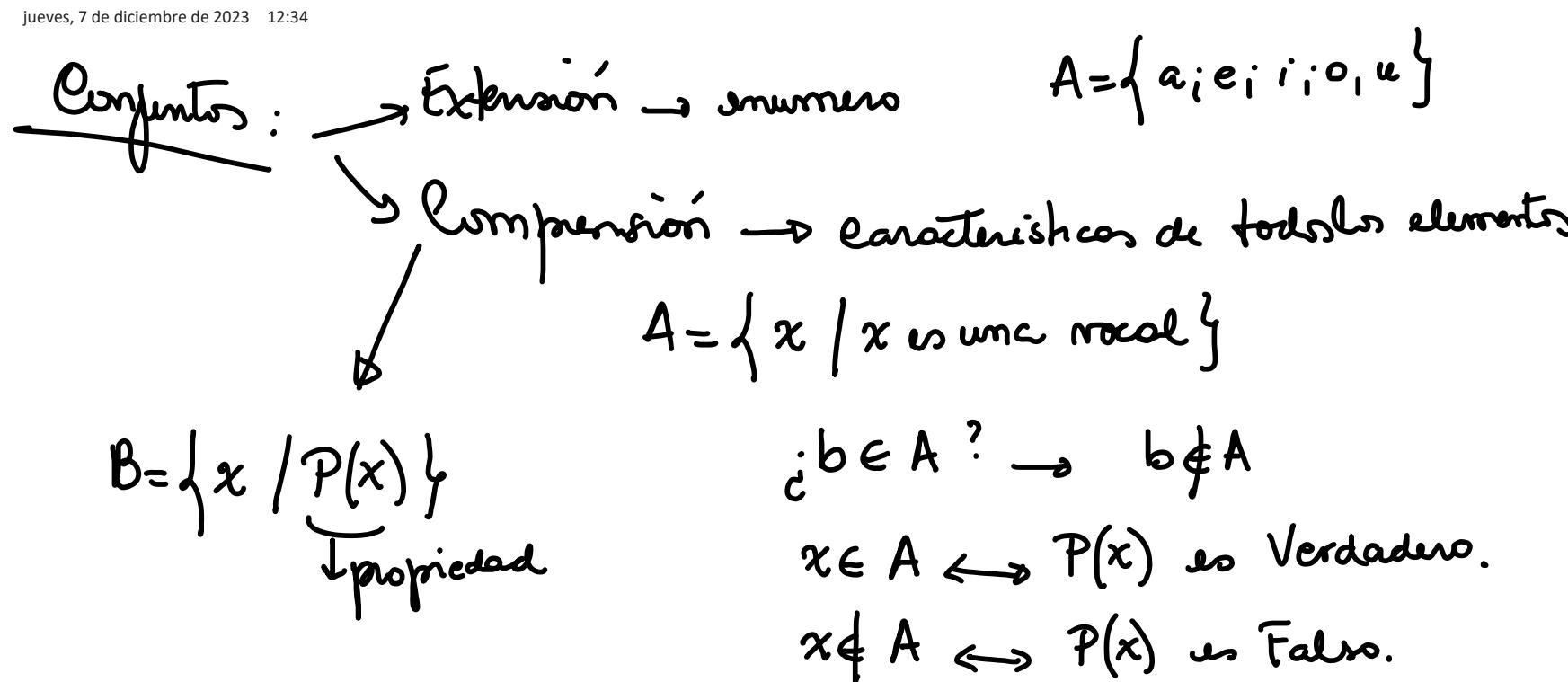


## Primera clase

jueves, 7 de diciembre de 2023 12:34



Conjunto Universal o referencial : conjunto que contiene a todos los elementos → Simbolo:  $U$

$$B = \{x \in U | P(x)\}$$

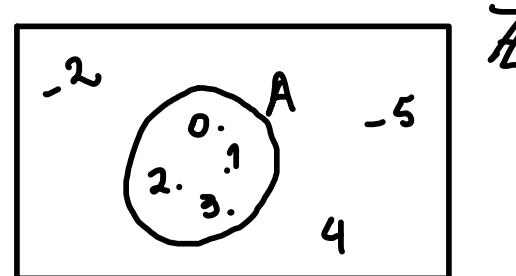
$$C = \{x \in \mathbb{Z} / -1 < x \leq 4\} = \{0; 1; 2; 3; 4\}$$

*tal que*

Definición por comprensión

C definido por extensión

Graficamente:



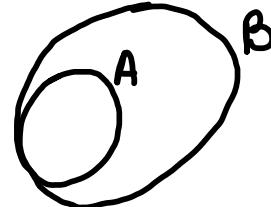
$\mathbb{Z}$

$$A \subseteq \mathbb{Z}$$

$$x \in A \Rightarrow x \in \mathbb{Z}$$

On que:  $A \subset B \iff x \in A \Rightarrow x \in B$

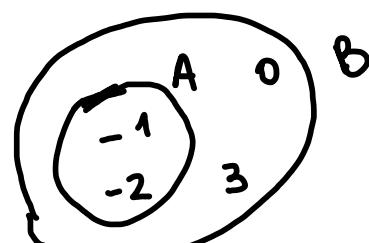
Diagrama de Venn



$$\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R}$$

$$\mathbb{I} \subset \mathbb{R}$$

$$B = \{0; -1; -2; 3\} \quad ; \quad A = \{-1, -2\}$$



$$-1 \in A \rightarrow -1 \in B$$

$$-2 \in A \rightarrow -2 \in B$$

$$\therefore A \subset B$$

$$A \subseteq B , A = B$$

$$A = B \iff A \subseteq B \wedge B \subseteq A$$

*sí y solo si*

## Operaciones entre Conjuntos

Complemento: Sea  $A$  un conjunto ,  $\mathcal{U}$ : universal

$$A' = A^c = \bar{A} = \{x \in \mathcal{U} \mid x \notin A\}$$

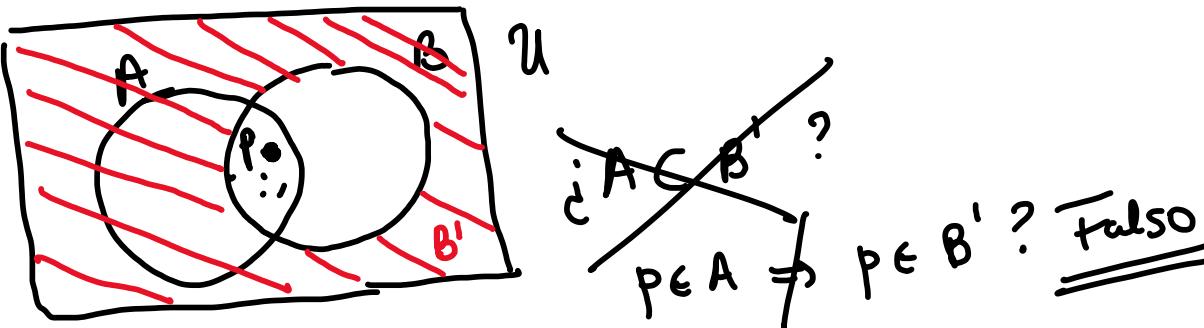


Ej:  $A = \{2; 3; 4\}$      $\mathcal{U} = \{x \in \mathbb{N}_0 \mid x \text{ es un dígito}\}$

1 . . . . . | 4 · 9 · 9 · 9

$$A' = \{0; 1; 5; 6; 7, 8; 9\} \quad ; \quad B = \{7, 10, 17\}$$

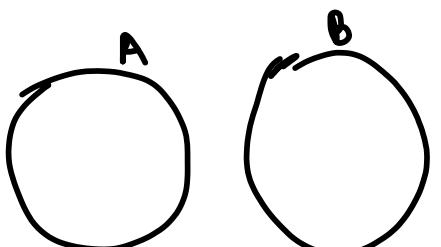
$$A \subset B' = \{0; 1; 2; 3; 4; 5; 6\}$$



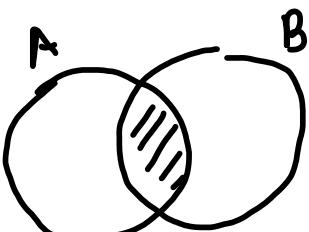
Operaciones binarias

→ Intersección: Sean  $A, B$  conjuntos

$$A \cap B = \{x \in U \mid x \in A \wedge x \in B\}$$



$$A \cap B = \emptyset$$



$$A \cap B \neq \emptyset$$

$A$  y  $B$  son disjuntos  
 $= \emptyset$  (No hay elementos en común)

$\neq \emptyset$  (Hay al menos 1 elemento en común)

-- T

$$A = \{x \in \mathbb{N} \mid x < 3\} = \{1; 2\}$$

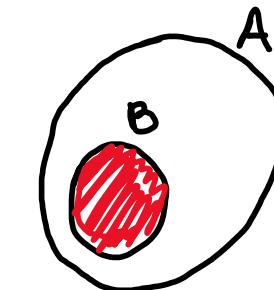
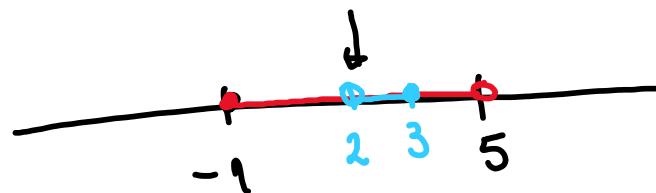
$$B = \{3; 4, 1; 5\}$$

$$A \cap B = \{1\}$$

$$A = \{x \in \mathbb{R} \mid -1 \leq x < 5\}$$

$$B = \{x \in \mathbb{R} \mid 2 < x \leq 3\}$$

$$A \cap B = \{x \in \mathbb{R} \mid 2 < x \leq 3\} = B$$



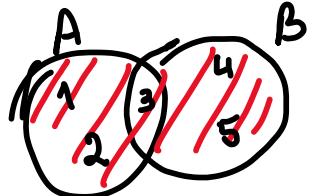
$$\mathbb{N} \cap \mathbb{Z} = \mathbb{N}, \mathbb{N} \subset \mathbb{Z}$$

~~$B \subset A \Rightarrow A \cap B = B$~~

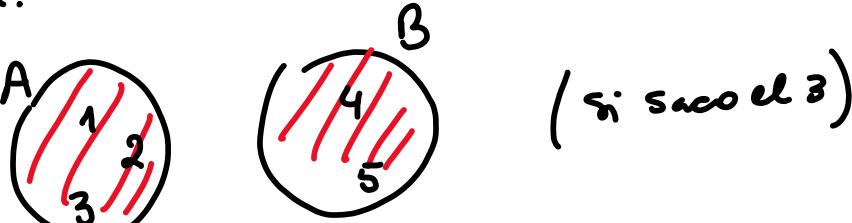
$$\mathbb{R} \cap \mathbb{Q} = \mathbb{Q}, \mathbb{Q} \subset \mathbb{R}$$

Unión entre conjuntos: Dados dos conjuntos A y B

$$A \cup B = \{ x \in U \mid \underbrace{x \in A}_{\text{verd.}} \vee \underbrace{x \in B}_{\text{verd.}} \}$$



$$A \cup B = \{ 1; 2, 3; 4, 5 \}$$



$$A \cup B = \{ 1, 2, 3; 4, 5 \}$$

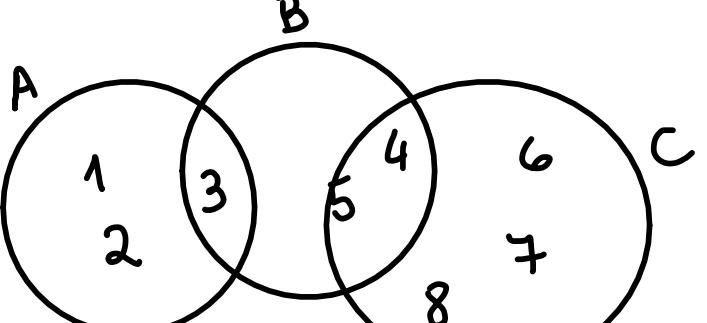
(si saco el 3)

$$A = \{ 1; 2, 3 \} \quad ; \quad B = \{ 3; 4; 5 \}$$

$$B \cup A = A \cup B = \{ 1; 2; 3; 4; 5 \} \quad ; \quad \underbrace{A \cap B = \{ 3 \}}_{B \cap A}$$

$$C = \{ 4; 5; 6; 7, 8 \}$$

$$A \cup B \cup C = \{ 1; 2, 3; 4, 5; 6; 7, 8 \}$$

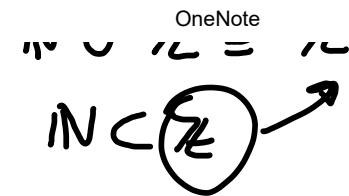


$$B \cap C = \{ 4; 5 \}$$

$$A \cap C = \emptyset$$

Mi 11 / -

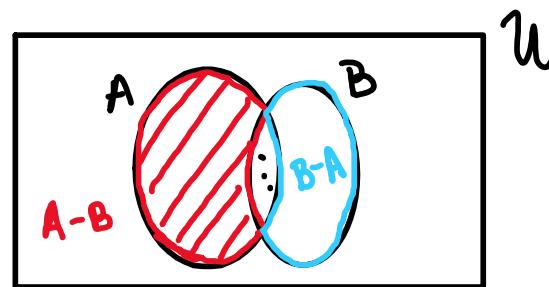
— —



Diferencia: A y B conjuntos

$$A - B = \{ x \in U \mid x \in A \wedge \underbrace{x \notin B}_{x \in B'} \} =$$

$$= \{ x \in U \mid \underline{x \in A} \wedge \underline{x \in B'} \} = \underline{\underline{A \cap B'}}$$



$$A = \{ 1; 2, \cancel{3}; 4 \}$$

$$B = \{ \cancel{1}; \cancel{3}; 5, 6 \}$$

$$A - B = \{ 2; 4 \} \quad ; \quad B - A = \{ 5; 6 \}$$

$$B - A = B \cap A'$$

Act. de Repas:  $B \cup B = B$

$$B \cap B = B$$

$$\overbrace{B - B} = \emptyset$$

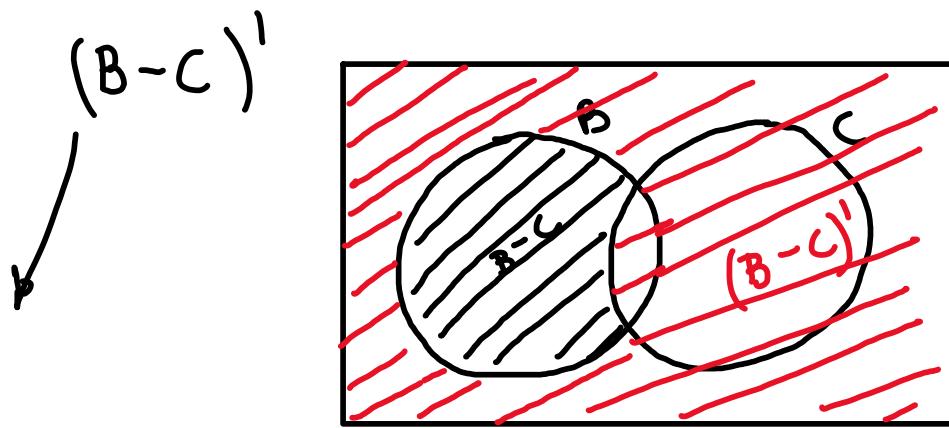
$$\overbrace{B \cap B'} = \emptyset$$

$$B \cup B' = U$$

$$(\emptyset)' = U \quad , \quad (U)' = \emptyset$$

$$\boxed{(A')' = A} \quad ; \quad A = \{1; 2; 3\} \quad ; \quad U = \{0; 1; 2; 3; 4\}$$

$$A' = \{0; 4\} \rightarrow (A')' = \{1; 2; 3\} = A$$



$$U$$

$$\overbrace{(B - C)}' = \overbrace{(B \cap C')}'$$

$$\overbrace{(B \cap C')}' =$$

$$\overbrace{B' \cup (C')}' =$$

Leyes de De Morgan:  $(A \cap B)' = A' \cup B'$

$B' \cup C'$

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

$$A - A = \emptyset$$