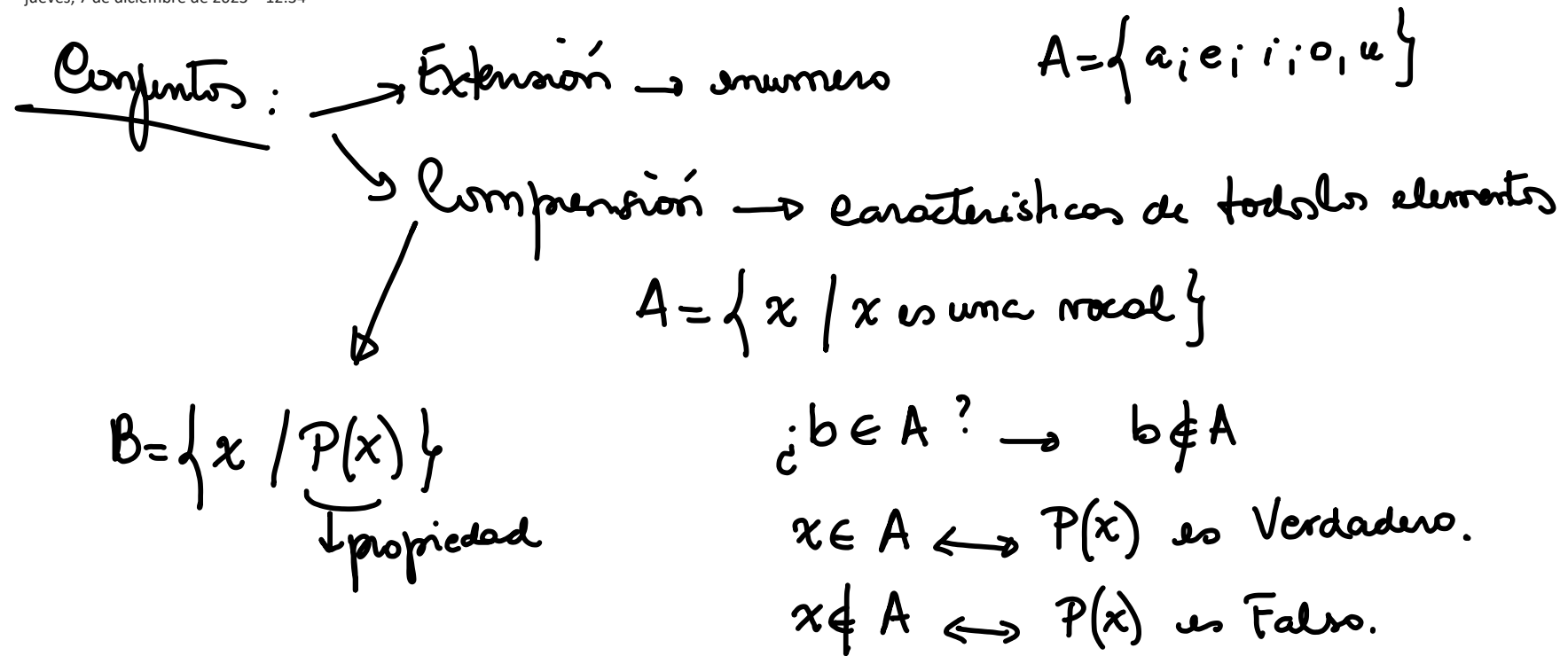


Primera clase

jueves, 7 de diciembre de 2023 12:34



Conjunto Universal o referencial : conjunto que contiene a todos los elementos → Símbolo: \mathcal{U}

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

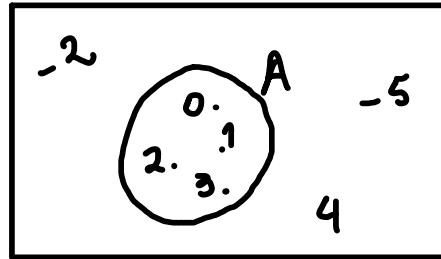
$$C = \{x \in \mathbb{Z} \mid -1 < x \leq 4\} = \{0; 1; 2; 3; 4\}$$

tal que

Definición por comprensión

C definido por extensión

Gráficamente:



\mathbb{Z}

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

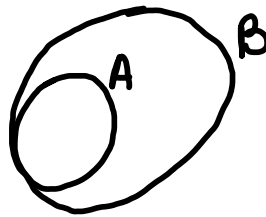
$$x \in A \Rightarrow x \in \mathbb{Z}$$

Inclusión:

Inclusión entre Conjuntos

$$A \subset B \Leftrightarrow x \in A \Rightarrow x \in B$$

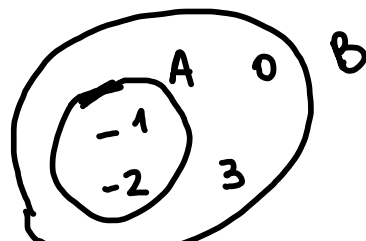
Diagrama de Venn



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

$$\pi \in \mathbb{R}$$

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



$$\begin{aligned} -1 \in A &\rightarrow -1 \in B \\ -2 \in A &\rightarrow -2 \in B \\ \therefore A &\subset B \end{aligned}$$

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

$$A = B \iff A \subset B \wedge B \subset A$$

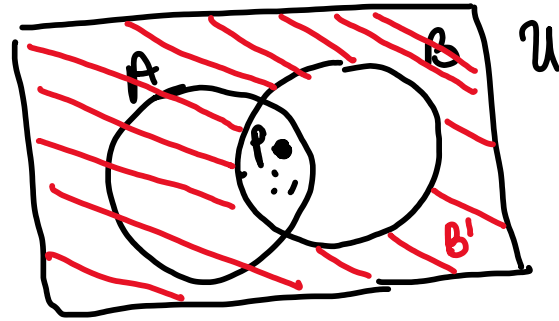
si yadon

si y solo si

Operaciones entre Conjuntos

$$A' = \{0; 1; 5; 6; 7; 8; 9\} \quad ; \quad B = \{7; 8; 9; 10; 11\}$$

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



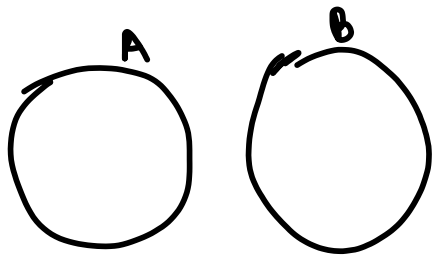
~~$A \subset B'$?~~

$p \in A \not\Rightarrow p \in B' ?$ Falso

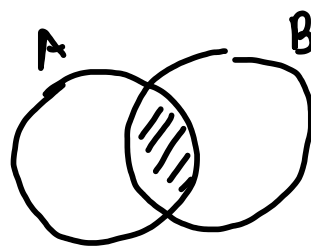
Operaciones binarias

Intersección: Sean A, B conjuntos

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



$$A \cap B = \emptyset$$



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

A y B son disjuntos

$\Rightarrow \emptyset$ (No hay elementos en común)

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

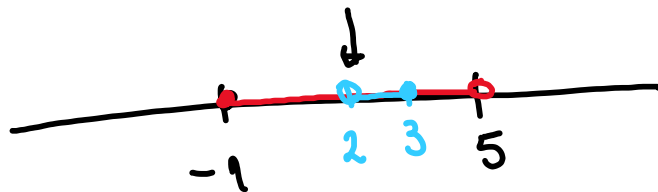
$$A = \{x \in \mathbb{N} \mid x < 3\} = \{1; 2\}$$

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

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

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

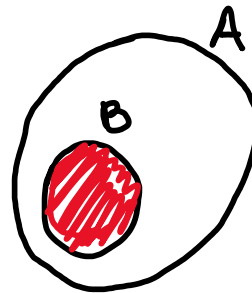
$$B = \{x \in \mathbb{R} \mid 2 < x \leq 3\}$$



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

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

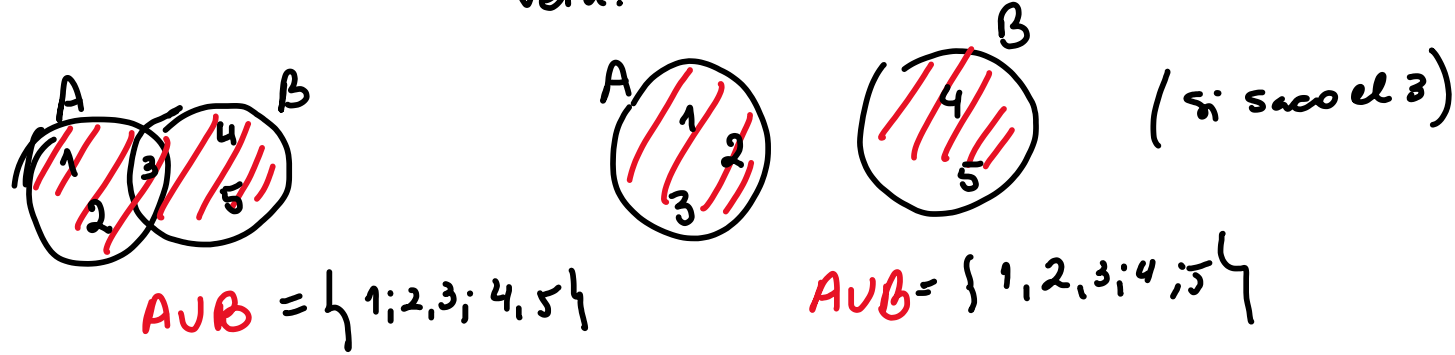
$$A \cap B = \{x \in \mathbb{R} \mid 2 < x \leq 3\} = B$$



$$\underline{B} \subset A \Rightarrow A \cap B = B$$

Unión entre conjuntos: Dados dos conjuntos A y B

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

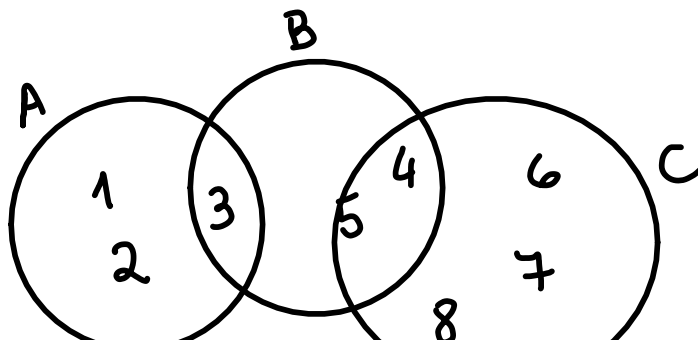


$$A = \{1; 2; 3\} \quad ; \quad B = \{3; 4; 5\}$$

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

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

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



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

$$A \cap C = \emptyset$$

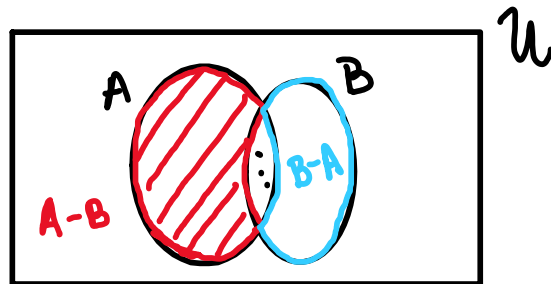
$$A \cap B \cap C = \emptyset$$

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

Diferencia: A y B conjuntos

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

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



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

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

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

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

Act. de Repaso: $B \cup B = B$
 $B \cap B = B$

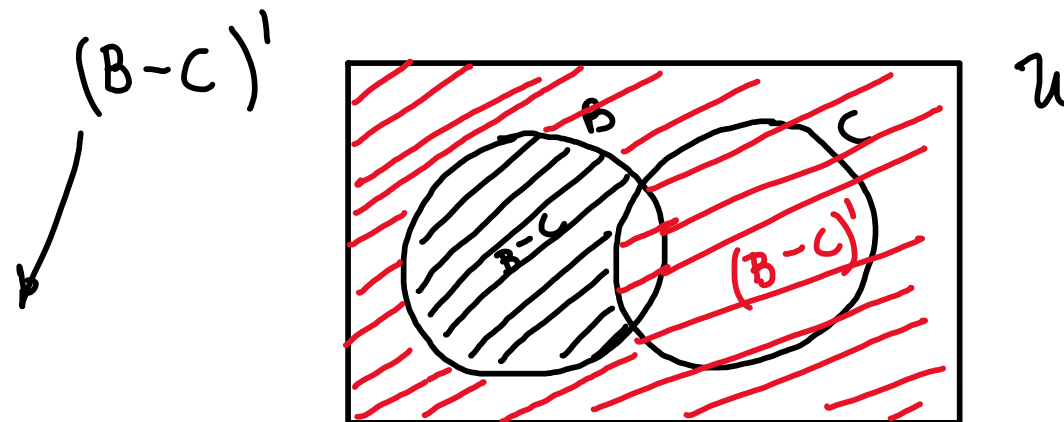
$$\underbrace{B - B}_{B \cap B'} = \phi$$

$$B \cup B' = U$$

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

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

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



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

$$(B \cap C')' =$$

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

$$\boxed{B' \cup C}$$

Leyes de De Morgan:

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

$$A - A = \emptyset$$