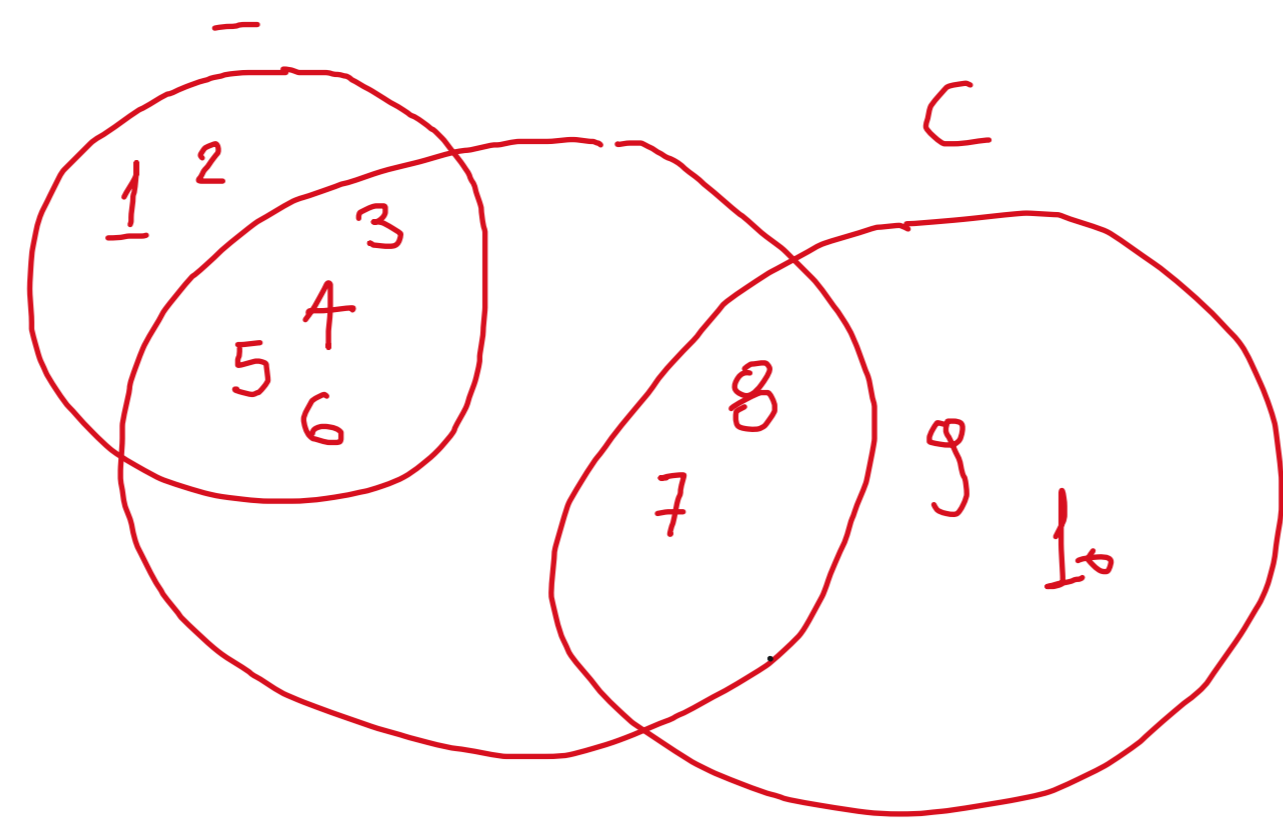


Conjuntos

- 2. $A = \{1, 2, 3, 4, 5, 6\}$
- $B = \{3, 4, 5, 6, 7, 8\}$
- $C = \{7, 8, 9, 10\}$



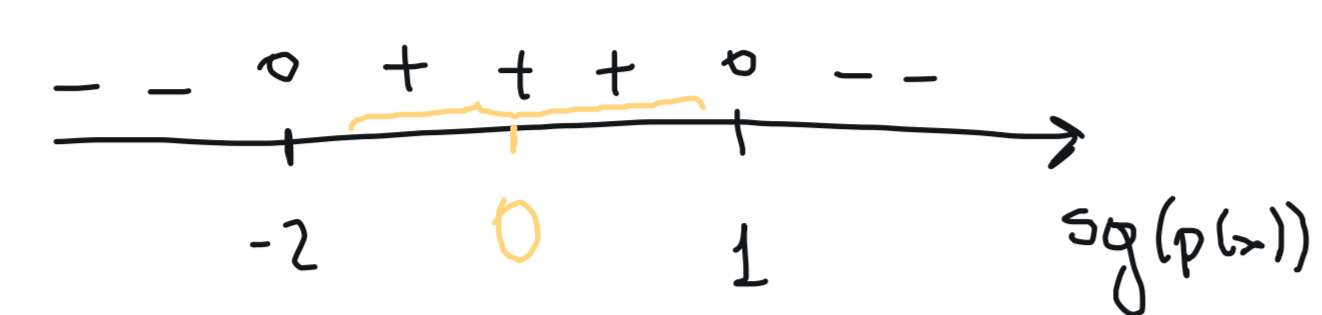
- a) $A \cap B = \{3, 4, 5, 6\}$
- b) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$
- c) $A \cup (B \cap C) = \{1, 2, 3, 4, 5, 6, 7, 8\}$
- d) $(A \cap B) \cup (B \cap A) = \{1, 2, 7, 8\}$

3. a) $\{n \in \mathbb{N} : n < 5\} = \{1, 2, 3, 4, 5\}$

d) $\{x \in \mathbb{R} : -x^2 - x + 2 < 0\}$

$p(x) = -x^2 - x + 2 = 0 \Rightarrow x = \frac{1 \pm \sqrt{(-1)^2 - 4(-1)(2)}}{2(-1)} = \frac{1 \pm \sqrt{9}}{-2} = \begin{cases} -1 \\ -2 \end{cases}$

punto de corte $p(0) = 2$

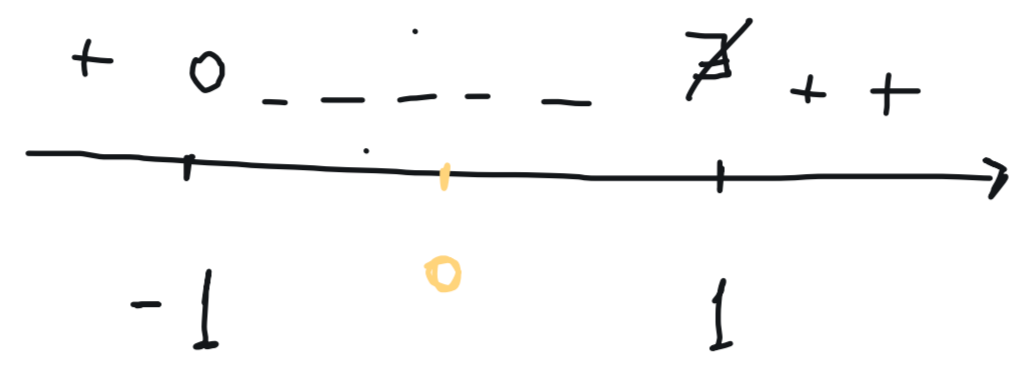


b) $\{x \in \mathbb{R} : \frac{x+1}{x-1} \geq 0\}$ $p(x) = \frac{x+1}{x-1}$

punto de corte $p(0) = -1$

raíz $x+1=0 \rightarrow x=-1$

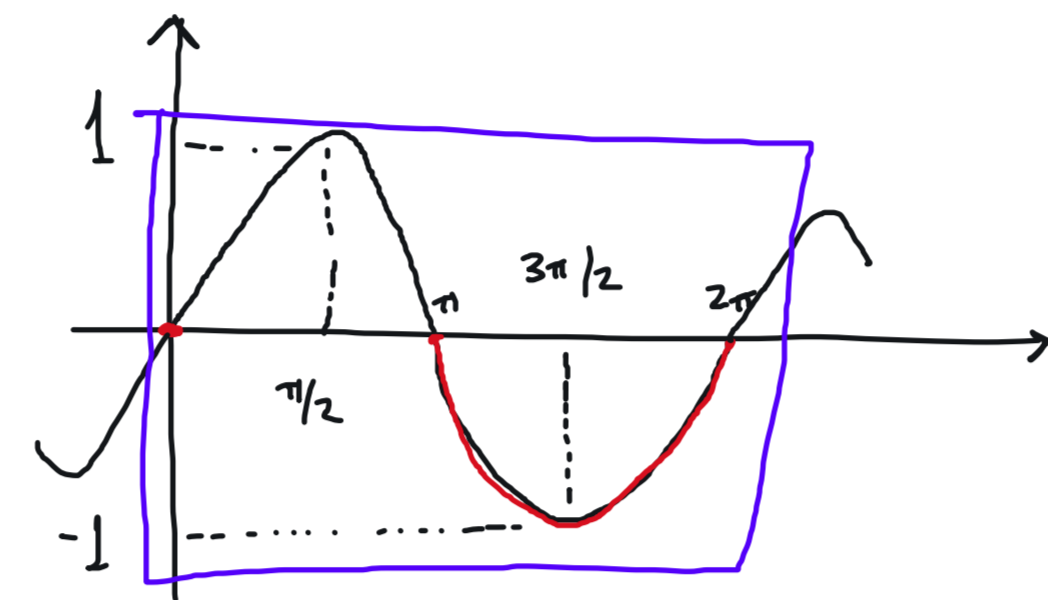
punto de no existencia $x-1=0 \rightarrow x=1$



$x \in (-\infty, -1] \cup (1, +\infty)$

d) $\{x \in [0, 2\pi] : \sin(x) \leq 0\}$

$x \in [\pi, 2\pi] \cup \{0\}$



6. Producto cartesiano $A \times B = \{(a,b) : a \in A, b \in B\}$

a) $A = \{1, 2, 3\}$ $B = \{a, b, c\}$

$A \times B = \{(1,a), (1,b), \dots, (3,c)\}$

$B \times A = \{(a,1), (a,2), \dots, (c,3)\}$

b) $\left. \begin{matrix} (x,y) \in A \times B \\ (x,y) \in B \times A \end{matrix} \right\} \Rightarrow \{x,y\} \subset A \cap B$

$\exists x,y : \left\{ \begin{matrix} (x,y) \in A \times B \Rightarrow x \in A, y \in B \\ (x,y) \in B \times A \Rightarrow x \in B, y \in A \end{matrix} \right\} \begin{matrix} x \in A, x \in B \\ y \in A, y \in B \end{matrix} \left\{ \begin{matrix} x \in A \cap B \\ y \in A \cap B \end{matrix} \right\} \Rightarrow \{x,y\} \subset A \cap B$

c) $A \times B = B \times A \Rightarrow A = B$

$\left. \begin{matrix} \forall (x,y) \in A \times B \Rightarrow \forall x \in A, \forall y \in B \\ \forall (x,y) \in B \times A \Rightarrow \forall x \in B, \forall y \in A \end{matrix} \right\} \begin{matrix} A \subseteq B \\ B \subseteq A \end{matrix} \Rightarrow A = B$

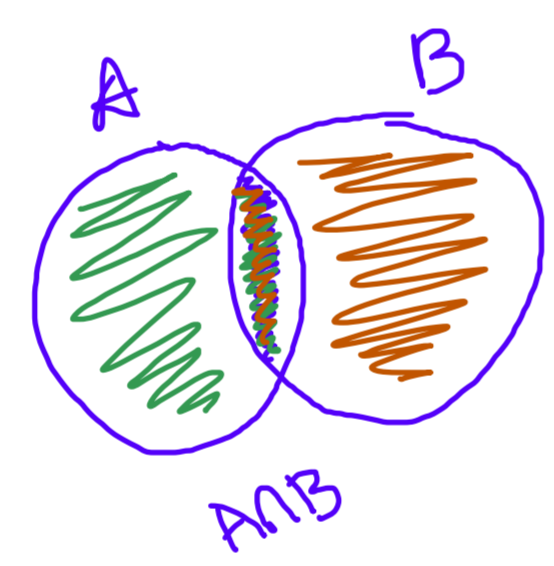
e) Sean A, B, C, D conjuntos, verificar que $(A \times B) \cup (C \times D) \subset (A \cup C) \times (B \cup D)$

$\forall (x,y) \in (A \times B) \cup (C \times D)$

caso 1 $(x,y) \in A \times B \rightarrow \begin{cases} x \in A \subset A \cup C \\ y \in B \subset B \cup D \end{cases} \Rightarrow (x,y) \in (A \cup C) \times (B \cup D)$

caso 2 $(x,y) \in C \times D \rightarrow \begin{cases} x \in C \subset A \cup C \\ y \in D \subset B \cup D \end{cases} \Rightarrow (x,y) \in (A \cup C) \times (B \cup D)$

7. a) $\left. \begin{matrix} \#A = 15 \\ \#B = 7 \end{matrix} \right\} \#(A \times B) = 15 \times 7 = 105$



$\#A + \#B - \#(A \cap B) = \#(A \cup B)$

b) $\left. \begin{matrix} \#A = 20 \\ \#B = 30 \\ \#(A \cup B) = 37 \end{matrix} \right\} \#(A \cap B) = \#A + \#B - \#(A \cup B) = 13$

c) $\left. \begin{matrix} \#A = 20 \\ \#B = 30 \\ \#(A \cap B) = 15 \end{matrix} \right\} \#(A \cup B) = \#A + \#B - \#(A \cap B) = 35$

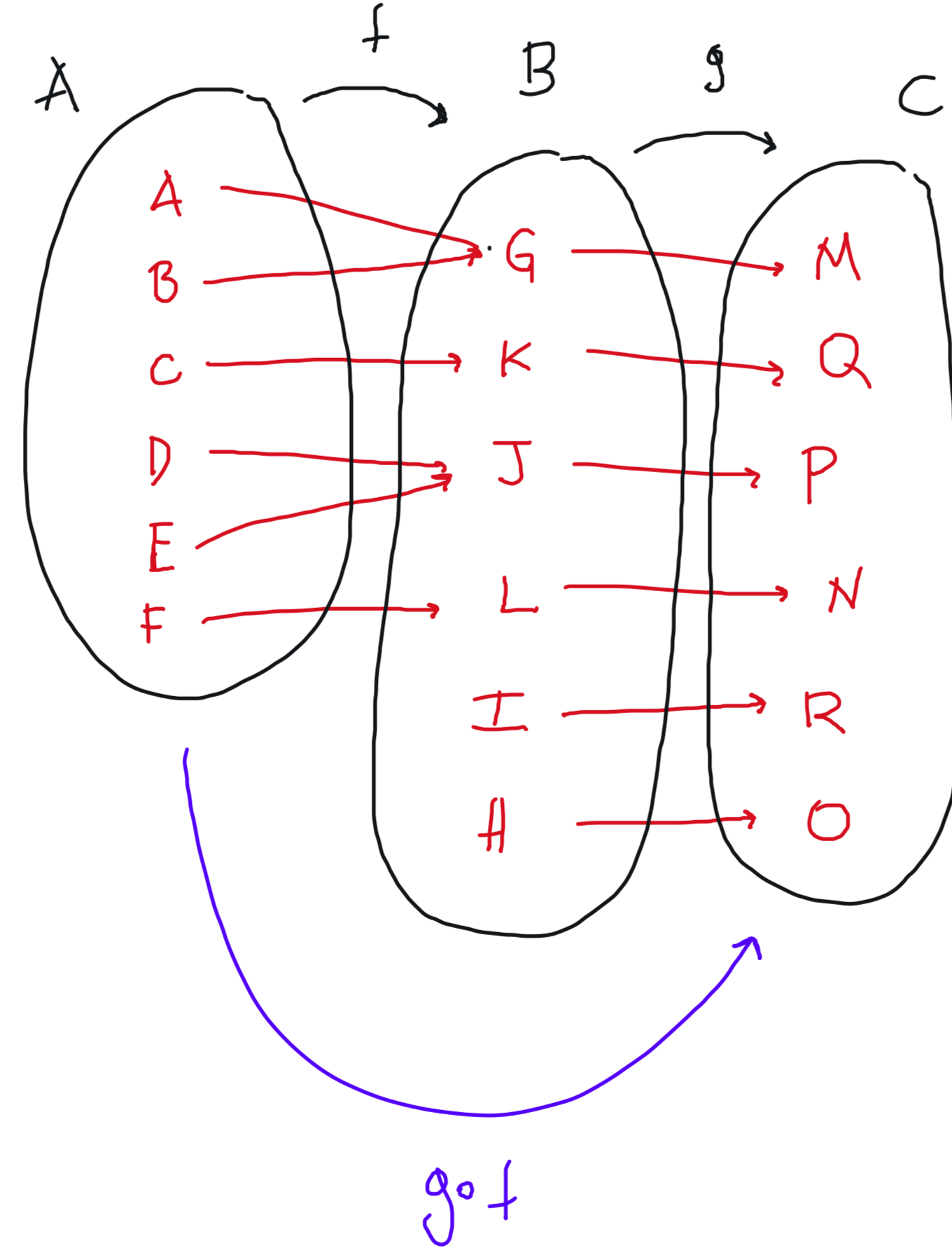
Funciones

Función inyectiva $\forall a, b \in X, f(a) = f(b) \Rightarrow a = b$

Contrarrecíproca $\forall a, b \in X, a \neq b \Rightarrow f(a) \neq f(b)$

Función sobreyectiva $\forall y \in Y \exists x \in X : f(x) = y$

1.



$g \circ f(A) = M$
 $g \circ f(B) = N$
 $g \circ f(C) = O$
 $g \circ f(D) = P$
 $g \circ f(E) = Q$
 $g \circ f(F) = R$

	iny	sob	bi
f	N_0	N_0	N_0
g	S_1	S_1	S_1
$g \circ f$	N_0	N_0	N