Exercise 1

$$A \cap B = \{ x \mid x > 0 \cap x \neq 1 \}$$

$$(A \cap B) \cup C = \{ x \mid x \neq 0, x \neq 1 \}$$

$$= \mathbb{R} \setminus \{1\}.$$

$$B \cap C = C$$

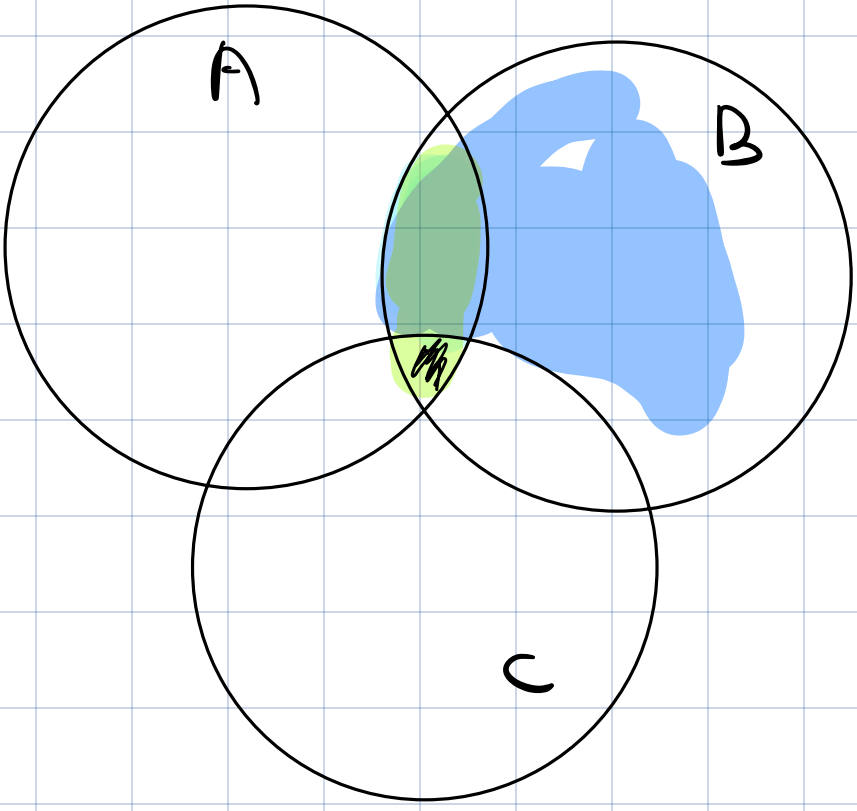
$$A \cup (B \cap C) = \{ x \mid x < 1 \wedge x < 0 \}$$

$$= \mathbb{R}.$$

Exercise 2

$A \cap (B - C)$

$= A \cap B - A \cap C$



$A \cap (B \cap \bar{C}) = A \cap B \cap \bar{C}$

Exercise 3

f is not a function (overlap of definitions)

Exercise 4

injective $f(x_1) = f(x_2)$

$\Rightarrow x_1 = x_2$

$$2 - \frac{1}{x} = \frac{1}{1-x} - 2$$

$$\Leftrightarrow 4 = \frac{1}{1-x} + \frac{1}{x}$$

$$\Leftrightarrow 4 = \frac{x}{(x-x^2)} + \frac{1-x}{(x-x^2}$$

$$= \frac{1}{(x-x^2)}$$

$\Leftrightarrow -x^2 + x = \frac{1}{4}$

$\Leftrightarrow -x^2 + x - \frac{1}{4} = 0$

$x_1 = \frac{1}{2}$.

injective

bijective

$0 < x < \frac{1}{2}$ $\quad]-\infty, 0[$

$1/2 \leq x < 1$ $\quad [0, +\infty[$

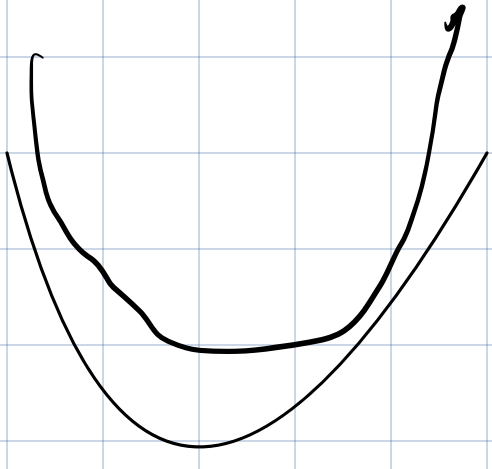
↑

surjective

Exercise 5

- O Vrai
- O Faux
- O Vrai
- O Faux

$$\frac{x^2+1}{x^2+2}$$



$$\frac{(-2)^2+1}{(-2)^2+2}$$

$\frac{1}{2}$ $\frac{5}{}$

Exercice 6

$$f(x_1) = f(x_2)$$

$$\Rightarrow x_1 = x_2$$

$$\begin{cases} x_1 + \delta = x_2 + \delta \\ \Rightarrow x_1 = x_2 \end{cases}$$

$$\begin{cases} -x_1 + \delta = -x_2 + \delta \\ \Leftrightarrow x_1 = x_2 \end{cases}$$

$$\begin{cases} x_1 + \delta = x_2 + \delta \\ \Rightarrow x_1 = x_2 \end{cases}$$

$$\begin{cases} -x_1 - \delta = -x_2 - \delta \\ \Rightarrow x_1 = x_2 \end{cases}$$

$$x_1 + \delta = -x_2 + \delta$$

$$\Leftrightarrow \quad x_1 = -x_2 \text{ . imp.}$$

$$x_1 + \delta = -x_2 - \delta$$

$$\Leftrightarrow \quad x_1 + x_2 = -2\delta$$

$$\Leftrightarrow \quad x_1 = -2\delta - x_2$$

x_2 free

surjective (seulement en décalage)

0 only first one line

Exercice 7

① • $\mathcal{P} = \{\phi\}$ minimum pour $\subseteq$.

② • Vrai (A et B ont les mêmes éléments s'ils ont le même powerset)

Exercise 8

$p(x)$

1. Vrai
2. Faux.