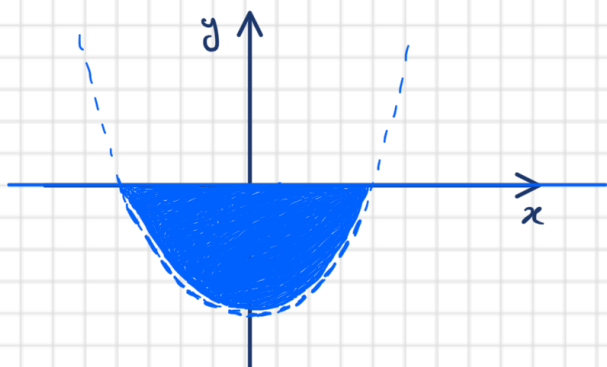


Problema de resolução do TG1 (Análise LCC → 2023-24)

1

$$A = \{(x, y) \in \mathbb{R}^2 : y > x^2 - 1 \text{ e } y \leq 0\} \cup \{(x, y) \in \mathbb{R}^2 : y = 0\}$$

a)



b) $A^\circ = \{(x, y) \in \mathbb{R}^2 : y > x^2 - 1 \text{ e } y < 0\}$

c) $\bar{A} = \{(x, y) \in \mathbb{R}^2 : y \geq x^2 - 1 \text{ e } y \leq 0\} \cup \{(x, y) \in \mathbb{R}^2 : y = 0\}$

d) $f(A) = \{(x, y) \in \mathbb{R}^2 : y = x^2 - 1 \text{ e } y \leq 0\} \cup \{(x, y) \in \mathbb{R}^2 : y = 0\}$

2

$$f : D \subseteq \mathbb{R}^2 \longrightarrow \mathbb{R} \\ (x, y) \longmapsto \sqrt{x^2 + \frac{y}{2}}$$

a) $D = \{(x, y) \in \mathbb{R}^2 : x^2 + \frac{y}{2} \geq 0\}$

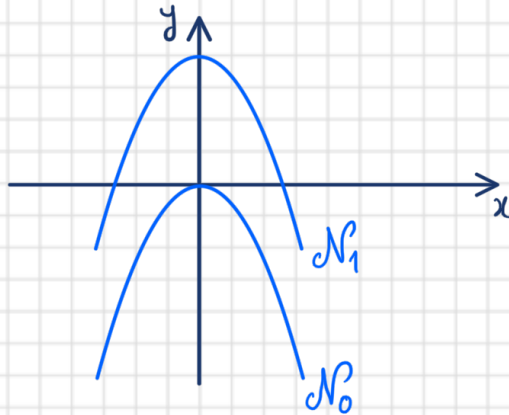
b) $\mathcal{N}_0 = \{(x, y) \in D : \sqrt{x^2 + \frac{y}{2}} = 0\}$

$$\sqrt{x^2 + \frac{y}{2}} = 0 \Leftrightarrow x^2 + \frac{y}{2} = 0 \Leftrightarrow y = -2x^2$$

parábola

$$c) \mathcal{N}_1 = \left\{ (x, y) \in \mathcal{D} : \sqrt{x^2 + \frac{y}{2}} = 1 \right\}$$

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



$$d) G_1(f) = \left\{ (x, y, z) \in \mathbb{R}^3 : (x, y) \in \mathcal{D} \text{ e } z = \sqrt{x^2 + \frac{y}{2}} \right\}$$

$$z = \sqrt{x^2 + \frac{y}{2}} \Rightarrow z^2 = x^2 + \frac{y}{2} \Leftrightarrow y = 2z^2 - 2x^2$$

equações de um parabolóide hiperbólico.