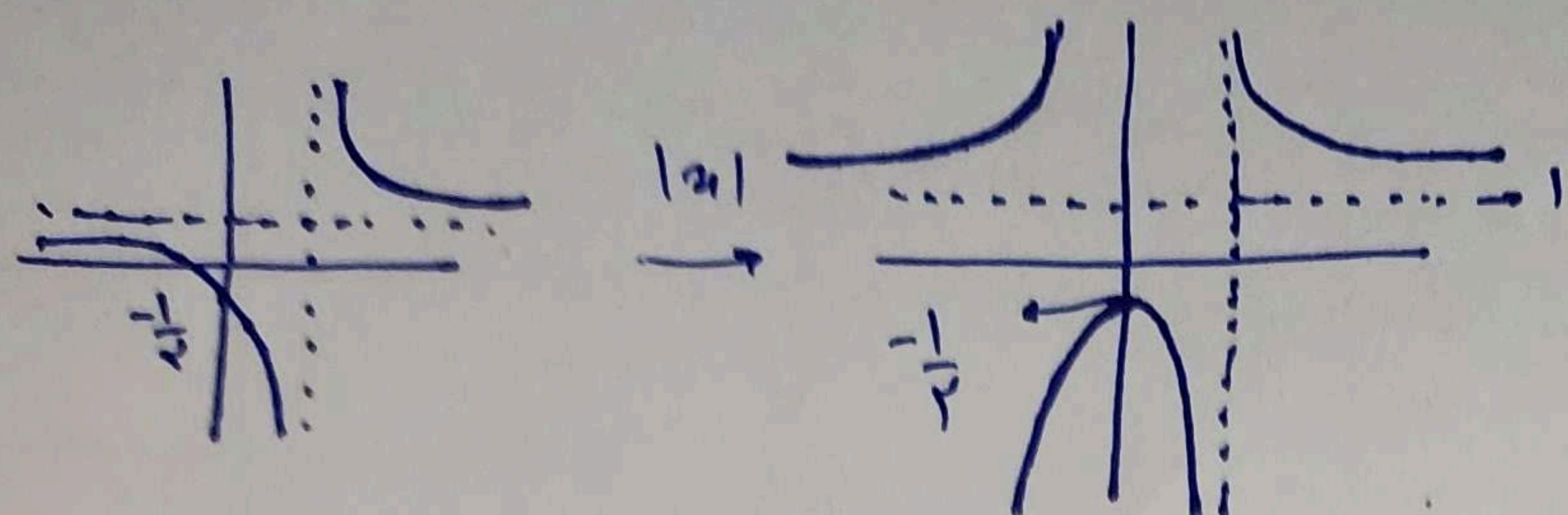


الف)



$$R_f = \mathbb{R} - (-\frac{1}{2}, 1]$$

ب)

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

$$\rightarrow |x| + \frac{1}{|x|} \xrightarrow{\text{میب}} R_f = [2, +\infty)$$

$$x^2 + 2x - 2 = yx + 3y \rightarrow x^2 + 2x - yx - 2 - 3y \rightarrow x^2 + x(2-y) + (-2-3y)$$

$$\Delta \geq 0 \quad b^2 - 4ac \rightarrow y^2 - 4y + 4 + 1 + 12y \geq 0 \quad y^2 + 8y + 12 \geq 0$$

$$(y+6)(y+2) \quad \frac{-6 \quad -2}{+1 \quad -12} \quad R_f = (-\infty, -6] \cup [-2, +\infty)$$

$$C_{13} = x^2 - x + \frac{1}{x} \rightarrow (x - \frac{1}{2})^2 = t$$

$$\text{نخرج} : x^2 - x + \frac{1}{x} + \frac{3}{4} \Rightarrow (x - \frac{1}{2})^2 + \frac{3}{4}$$

$$0 \leq \frac{t}{t + \frac{3}{4}} < 1$$

هرگز به انفرینیتی
اگرچه t شود ۰
می شود

$$R_f = [0, 1)$$

الف)

$$\max \begin{cases} \frac{-4}{-2} = 2 \\ y_{\max} = 3 \end{cases} \quad (-\infty, 3] \quad \text{رایکله} \quad [0, \sqrt{3}]$$

ب)

$$R_f = \mathbb{R}$$

رایکال خروج ۳
محدودیتی نداره

$$\frac{0}{+1} \quad \frac{4}{-1} \quad \frac{+}{+}$$

$$\text{الف)} \quad x^3 - x + 18 > 0$$

$$\log(0, +\infty)$$

$$\Rightarrow R_f = \mathbb{R}$$

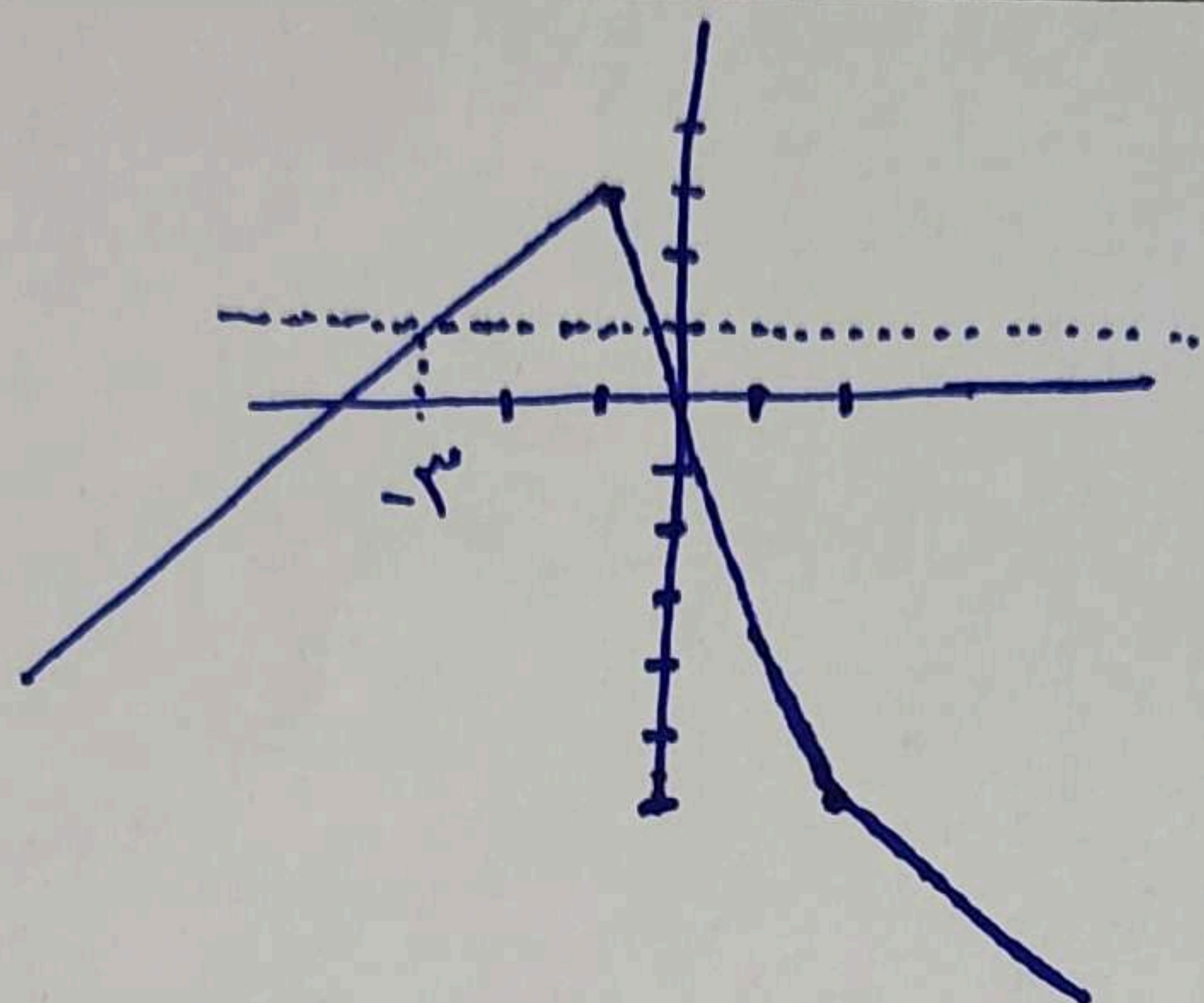
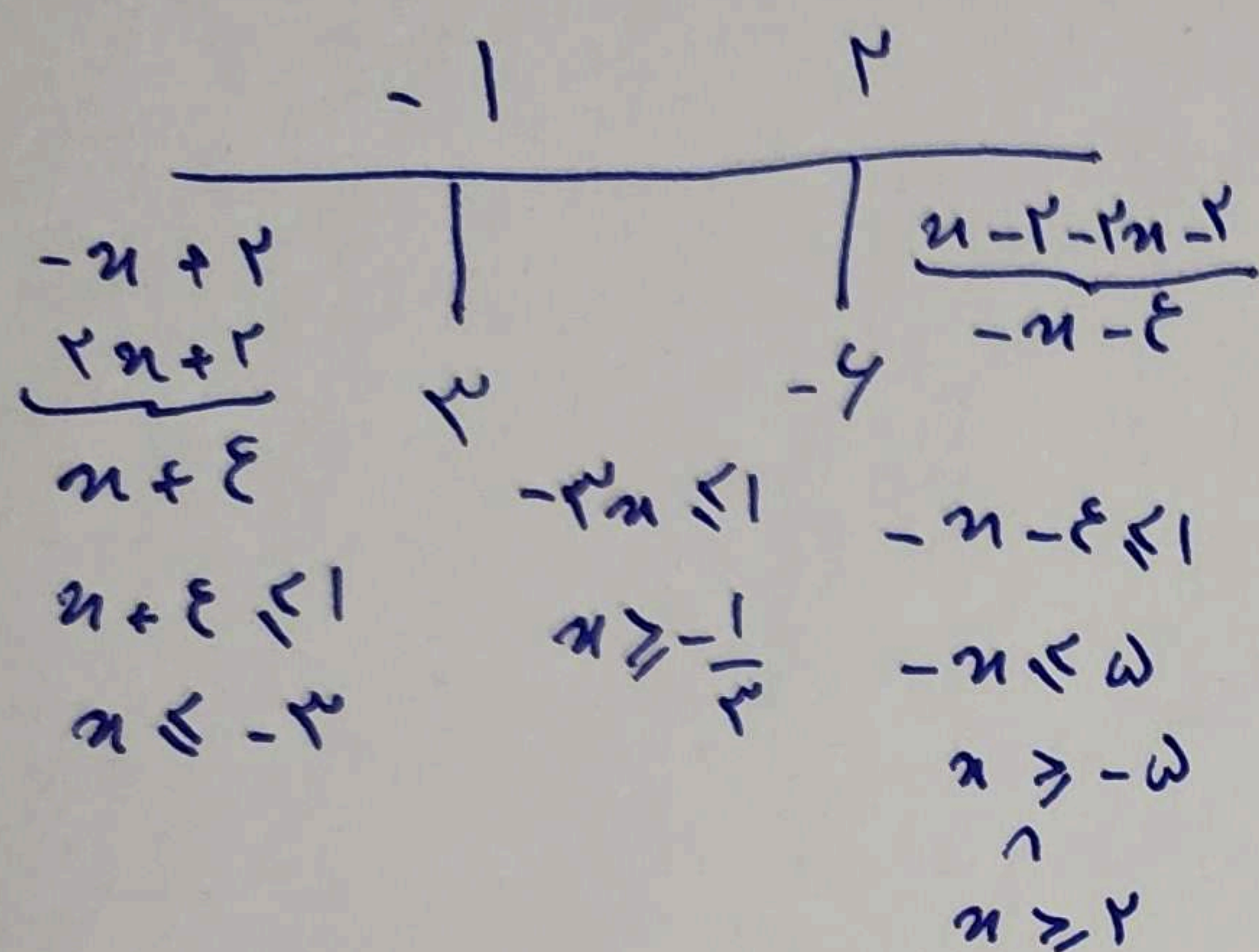
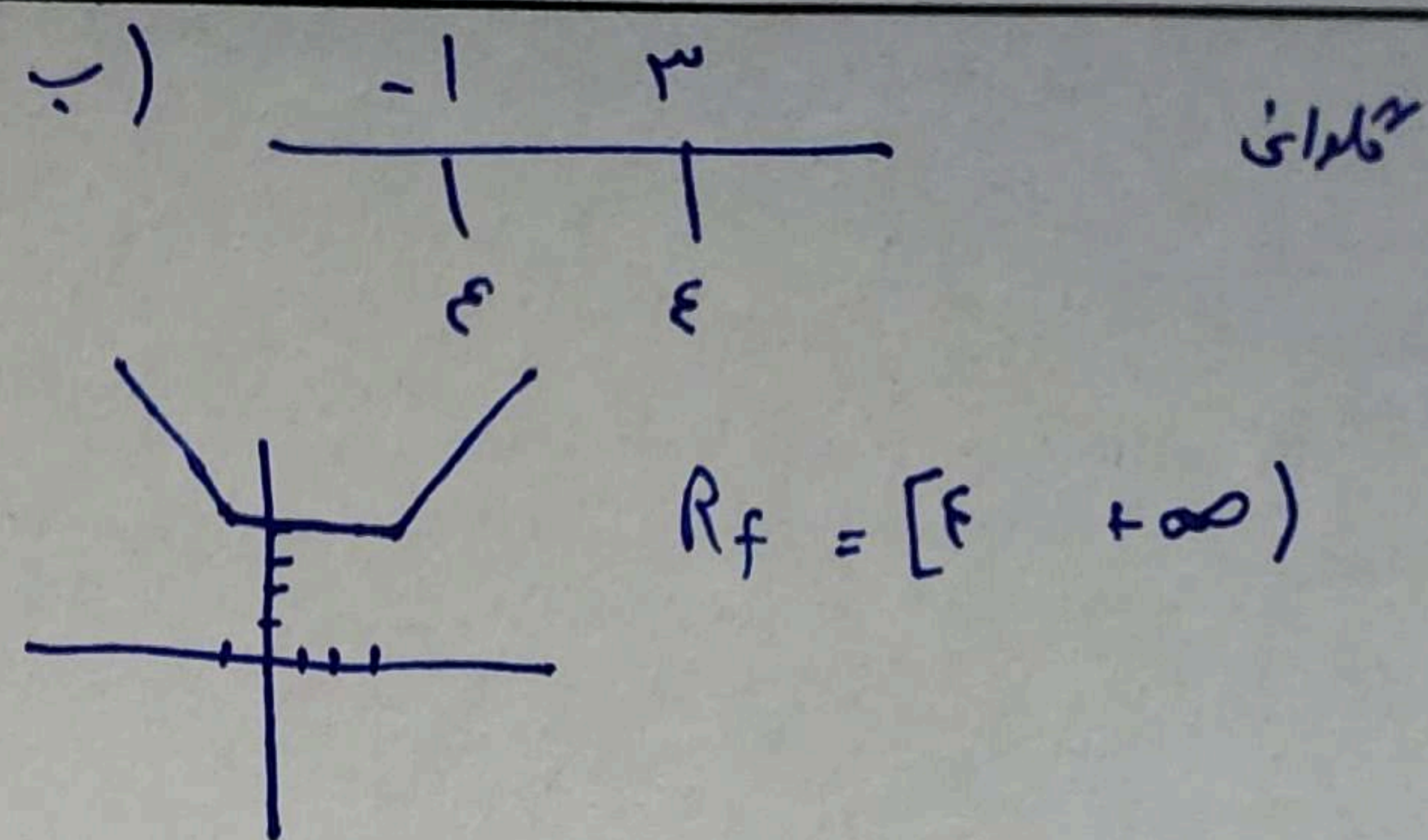
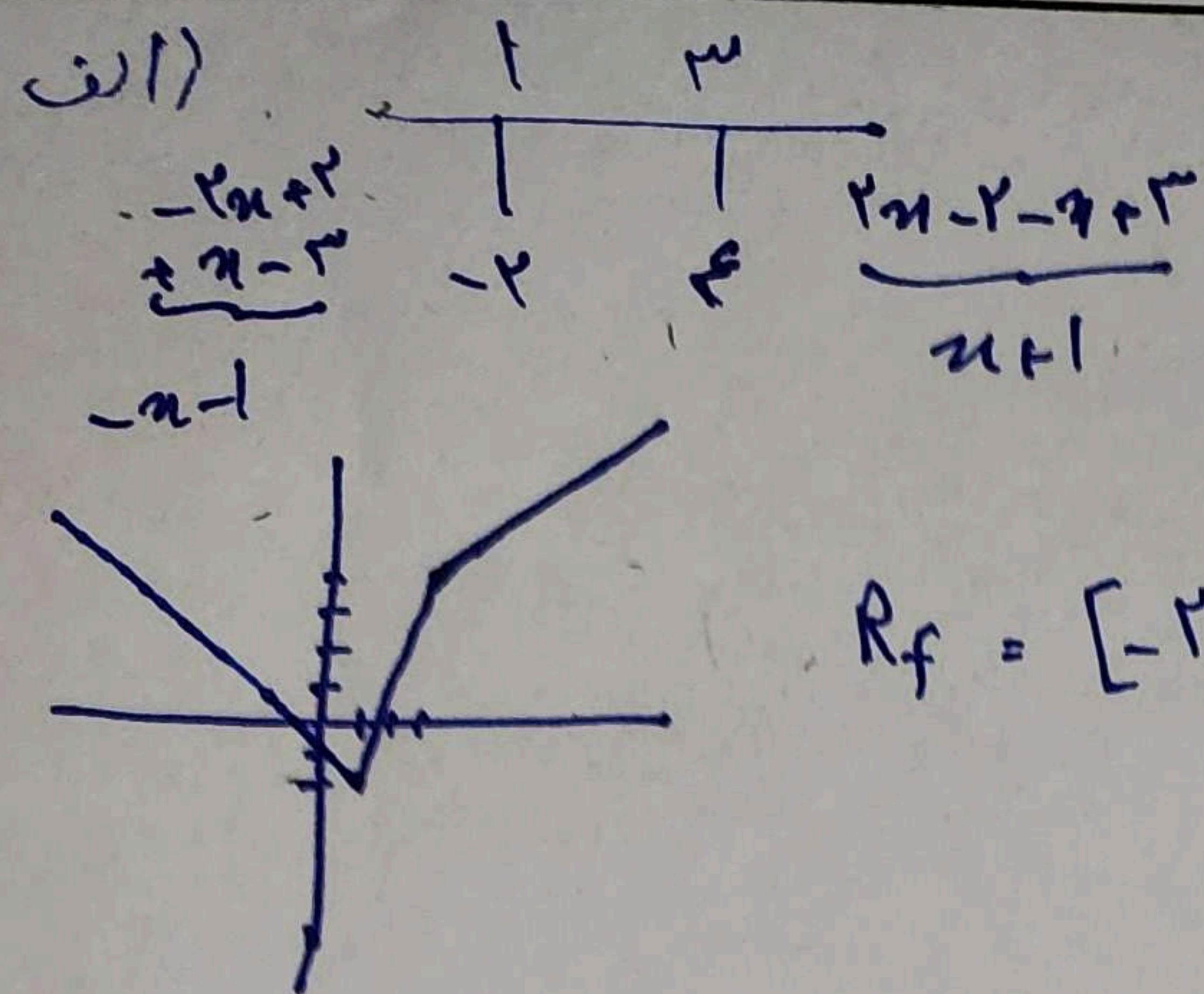
$$\begin{aligned} 0.1 &\rightarrow -1 \\ 0 &\rightarrow 0 \\ 1 &\rightarrow 1 \end{aligned}$$

$$\text{ب)} \quad \log_2 \left(\frac{x^2+1}{x} \right)$$

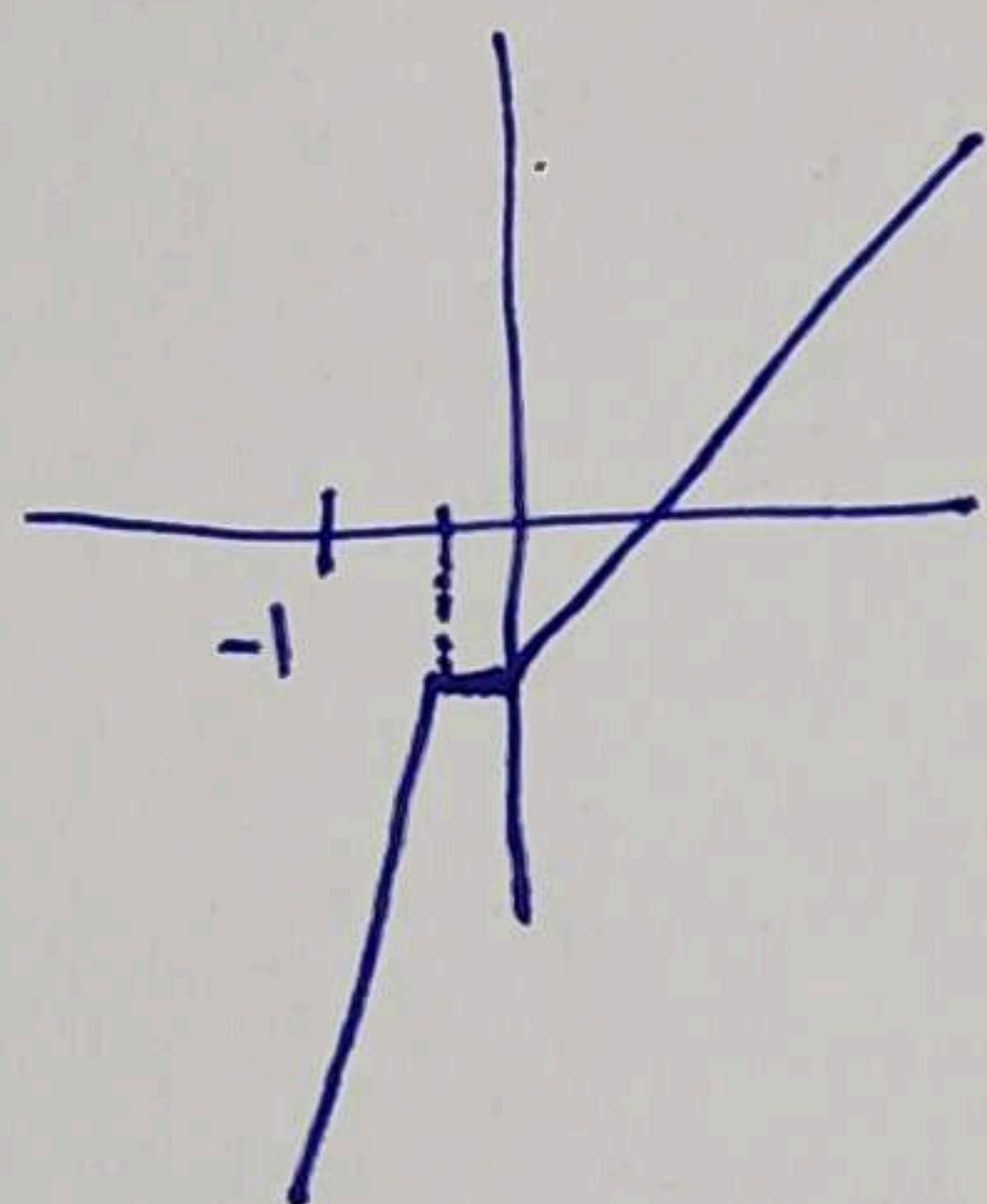
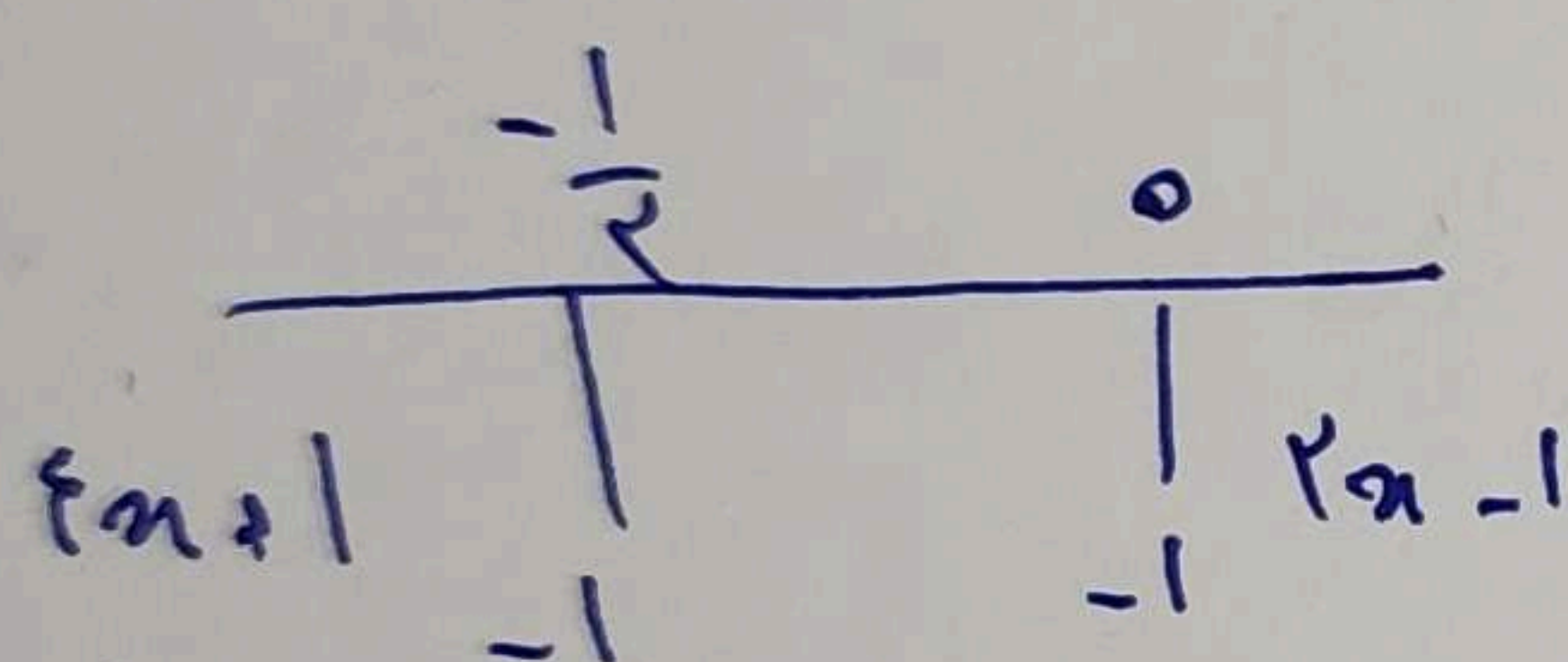
$$\Rightarrow \frac{x^2+1}{x} \Rightarrow x + \frac{1}{x}$$

$$\text{همینین} \quad x > 0 \Rightarrow [2, +\infty)$$

$$\log_2 [2, +\infty) \rightarrow R_f = [1, +\infty)$$

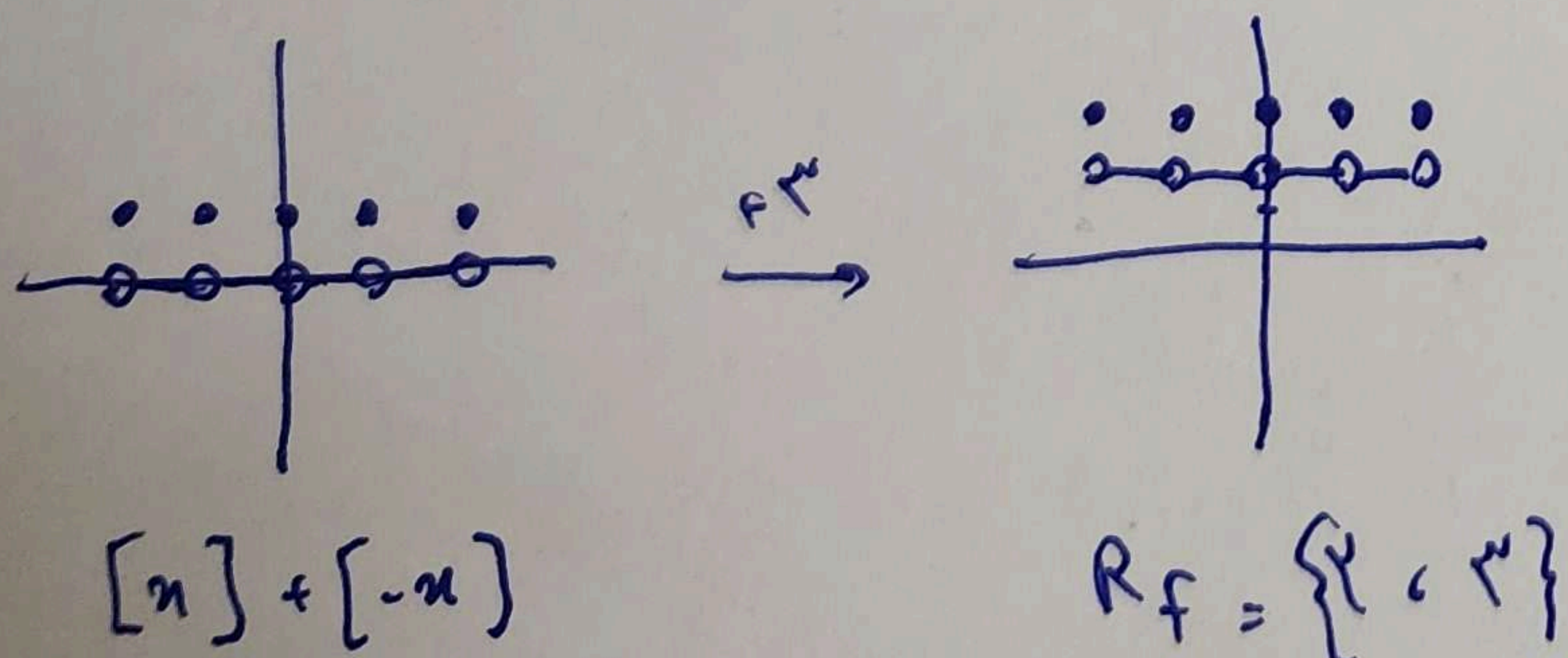


$(-\infty, -3] \cup [\frac{1}{3}, +\infty)$



$R_f = \mathbb{R}$

الف) $[x] + [-x] + 3$



ب) $\frac{3x+2}{x+1} + \frac{-2}{x+1}$

$-2 \leq x < -1 \Rightarrow [-2, -1)$

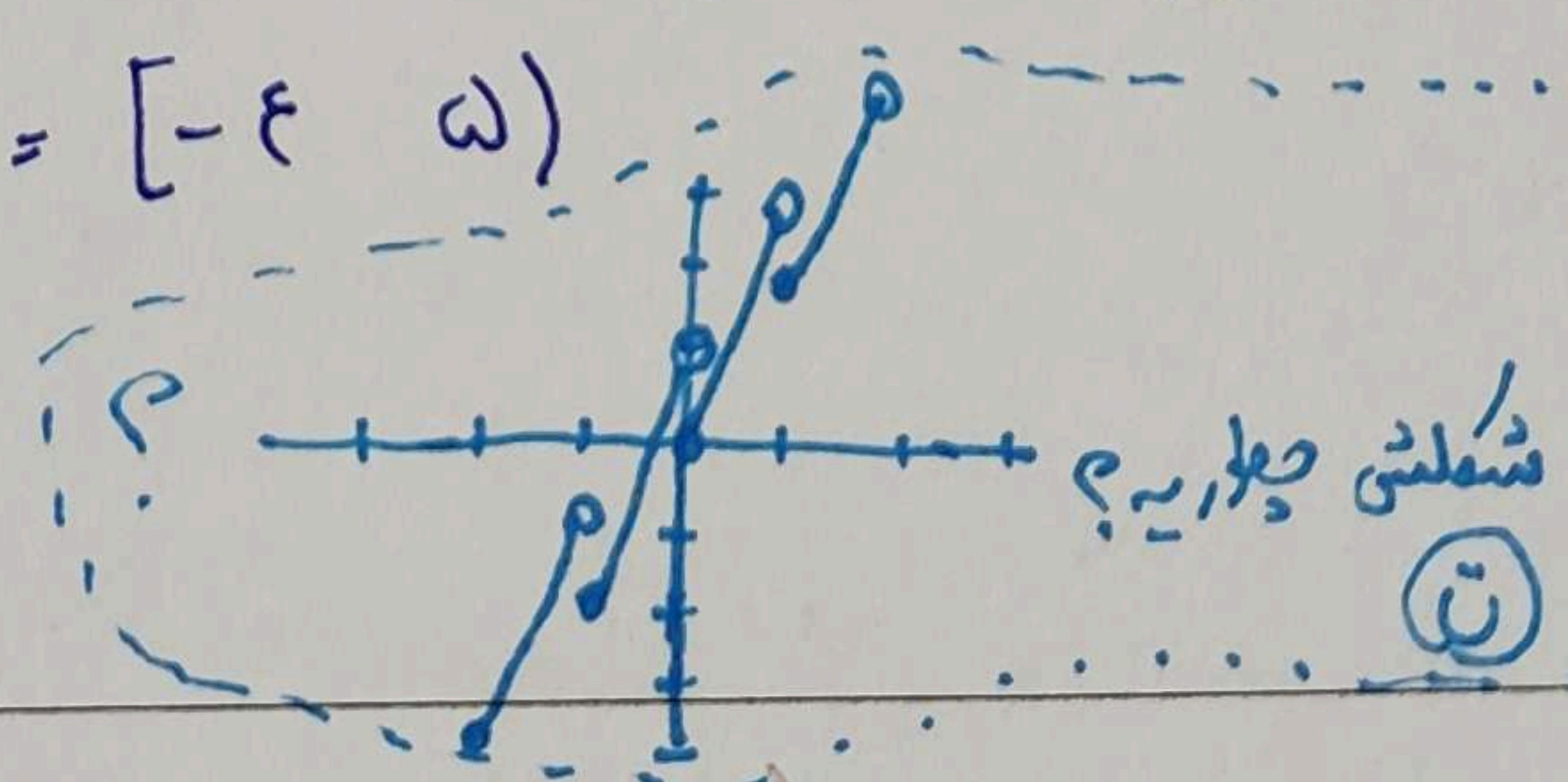
$-1 \leq x < 0 \Rightarrow [-1, 0)$

$0 \leq x < 1 \Rightarrow [0, 1)$

$1 \leq x < 2 \Rightarrow [1, 2)$

$x=2 \Rightarrow \{2\}$

$R_f = [-2, \infty)$



الف) $\rightarrow 1 \rightarrow 1 - 1 + 1 = 1$

$\square = \sin x$

$\rightarrow -1 \rightarrow 1 + 1 + 1 = 3$

$\rightarrow \frac{-b}{x_0} = \frac{1}{x} \rightarrow \frac{1}{x} - \frac{2}{x} + \frac{1}{x} = \frac{0}{x}$

$R_f = [\frac{3}{x}, 3]$

ب) $\rightarrow +1 \rightarrow 1 + 1 + 1 = 3$

$\square = \sin^2 x$

$\rightarrow 0 \rightarrow 0 + 0 + 1 = 1$

$\rightarrow \frac{-b}{x_0} = \frac{-1}{x} \rightarrow \frac{-1}{x} + \frac{1}{x} = 0$

$R_f = [1, 3]$