

سارینا انسانی روزهم دفتر B - شماره تلفن ۵

الف) $y = \frac{|x|+1}{|x|-2}$

①

$$y|x|-2y = |x|+1$$

$$y|x|-|x| = 2y+1$$

$$|x|(y-1) = 2y+1 \rightarrow |x| = \frac{2y+1}{y-1}$$

$$\frac{-\frac{1}{2}}{+\phi - \phi +}$$

$$R_f = \left(\frac{-\infty}{2}\right] \cup (1, +\infty)$$

ب) $y = \frac{x^2+1}{|x|}$

$$|x| + \frac{1}{|x|} \xrightarrow{|x| \geq 0} R_f = [2, +\infty)$$

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$$y = \frac{x^2+2x-2}{x+3}$$

$$yx+3y = x^2+2x-2$$

②

$$0 = x^2+2x-yx-2-3y$$

$$0 = x^2+(2-y)x-2-3y$$

$$\Delta \geq 0 \quad (2-y)^2 - 4(-2-3y) \geq 0$$

$$4+y^2-4y+8+12y \geq 0$$

$$y^2+8y+12 \geq 0$$

$$(y+4)(y+2) \geq 0 \quad \frac{-4-2}{+\phi - \phi +}$$

$$R_f = (-\infty, -4] \cup [-2, +\infty)$$

③

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

$$x^2-x+1 \neq 0$$

$$\Delta = b^2-4ac = 1-k = -2 < 0, a > 0$$

$$D_f = \mathbb{R} \leftarrow x^2-x+1 \leftarrow$$

$$yx^2-yx+y = x^2-x+\frac{1}{k}$$

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$$0 = x^2-yx^2-x+yx+\frac{1}{k}-y \rightarrow x^2(1-y)+x(y-1)+\frac{1}{k}-y=0$$

$$2 = \frac{y-1 \pm \sqrt{(y-1)^2 - 4(y-1)(y-\frac{1}{k})}}{4(y-1)} \rightarrow y \neq 1$$

$$(y-1)^2 - (y-1)(ky-1) \geq 0 \rightarrow (y-1)(y-1 - ky+1) \geq 0$$

$$-ky(y-1) \geq 0$$

$$\rightarrow R_f = [0, 1)$$

$$\begin{array}{c|c|c} 0 & 1 & \\ \hline - & + & - \end{array}$$

(K)

الف) $y = \sqrt{-x^2 + kx - 1}$

$$\max \left| \begin{array}{l} \frac{-b}{4a} = \frac{-k}{-4} = \frac{k}{4} \\ -k+1-1 = k \end{array} \right.$$

$$y = \sqrt{(-\infty, k]} \rightarrow R_f = [0, \sqrt{k}]$$

ب) $y = \sqrt[3]{kx^2 - 12x}$

$$\min \left| \begin{array}{l} \frac{-b}{2a} = \frac{12}{2k} = \frac{6}{k} \\ kx^2 - 12x = -12 \end{array} \right.$$

$$y = \sqrt[3]{[-12, +\infty)} \rightarrow R_f = [-2, +\infty)$$

الف) $y = \log(a^x - x + 1)$

(5)

$$\rightarrow (-\infty, +\infty)$$

$$\rightarrow \log(0, +\infty) \rightarrow R_f = (-\infty, -\infty)$$

$$\log_1 0 = -\infty, \log_1 +\infty = +\infty \rightarrow \mathbb{R}$$

ب) $y = \log_p \frac{2x+1}{x}$

$$\frac{2x+1}{x} > 0 \rightarrow x > 0$$

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

$$y = \log_r [2, +\infty)$$

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

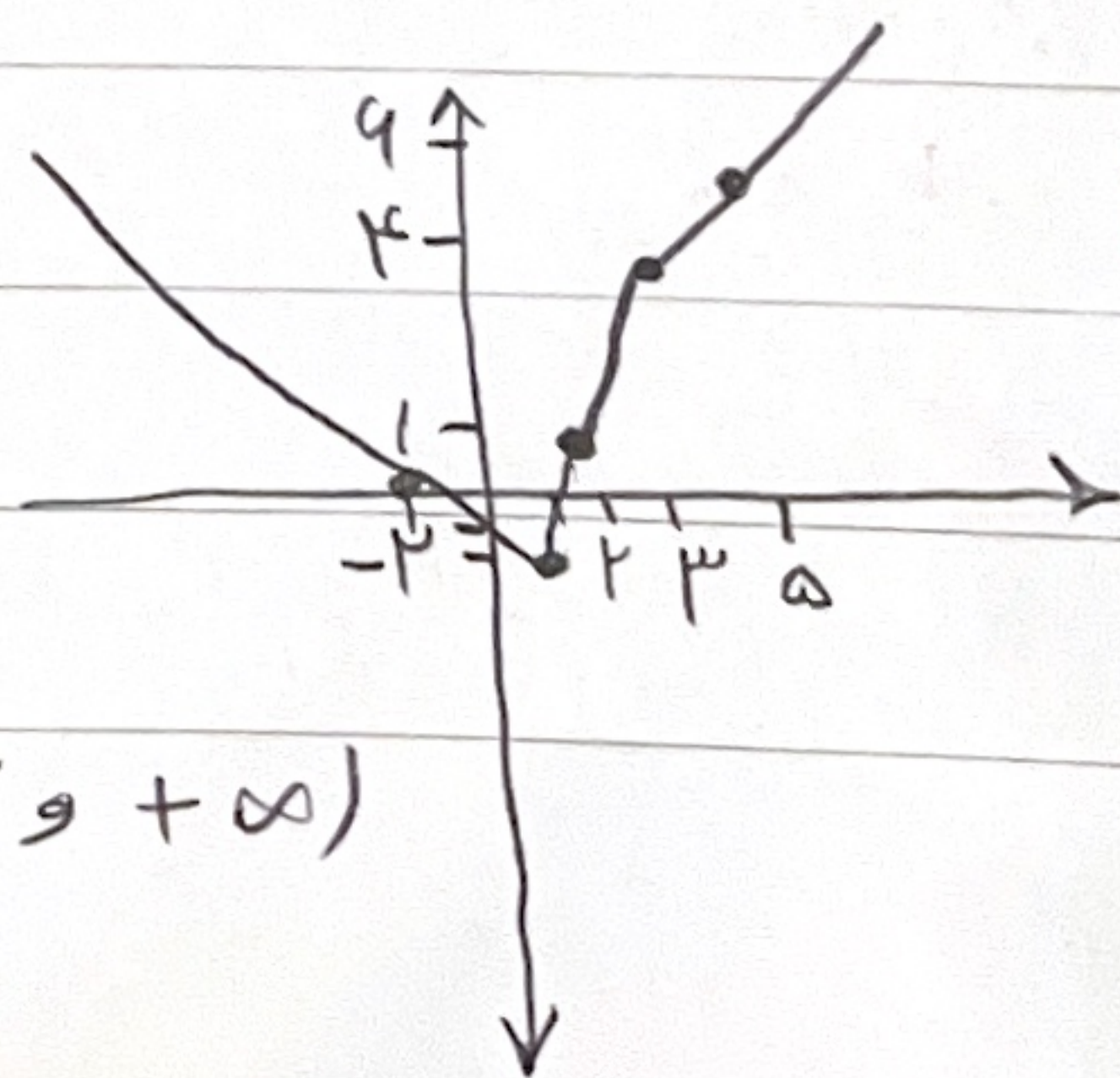
الف) $y = |kx-2| - |x-3|$

$$-x+3$$

$$\begin{array}{c|c|c} -2x+2+x-3 & 1 & 3 \\ \hline -x-1 & kx-2 & kx-2-x+3 = x+1 \end{array}$$

$$kx-2+x-3$$

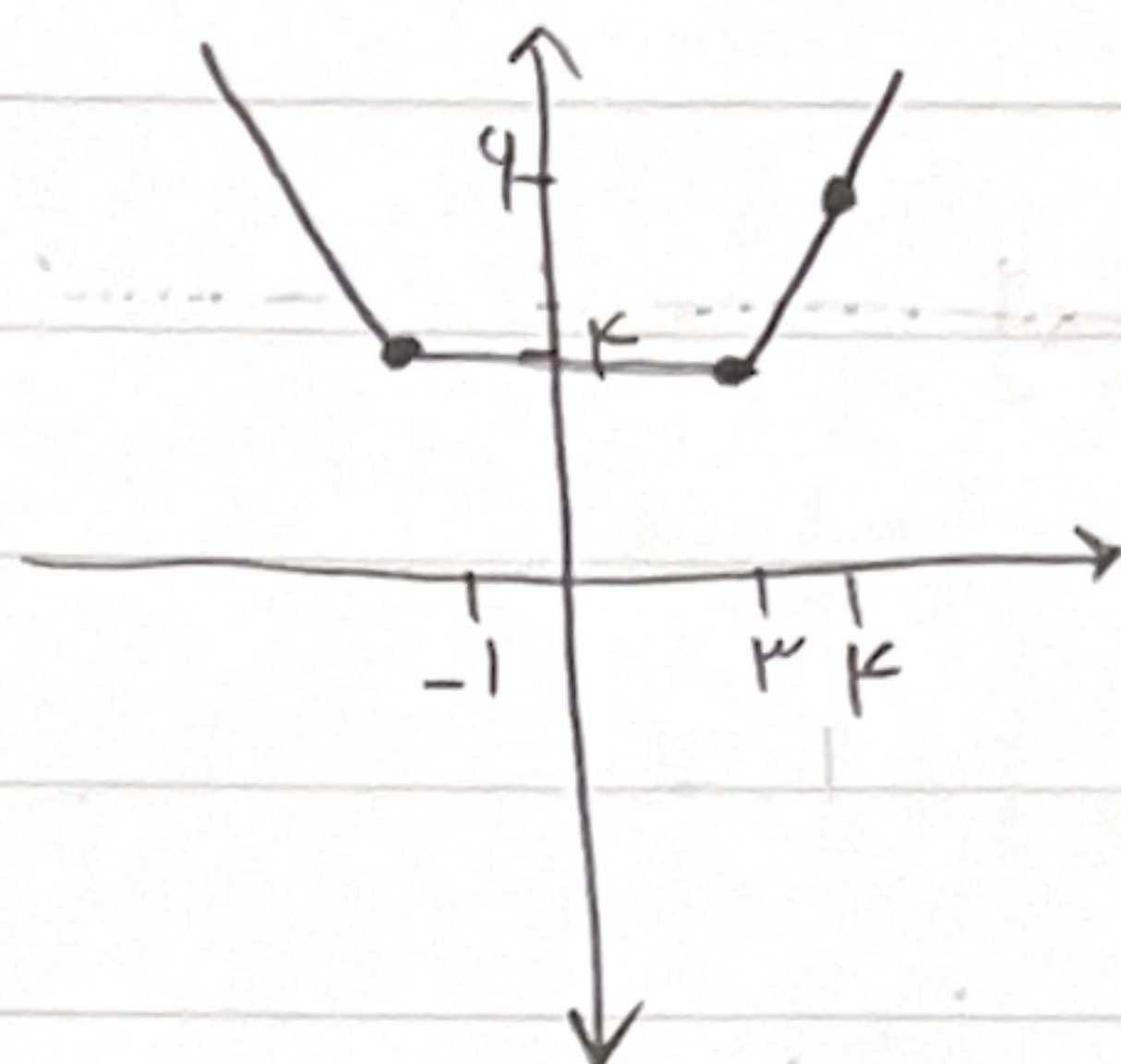
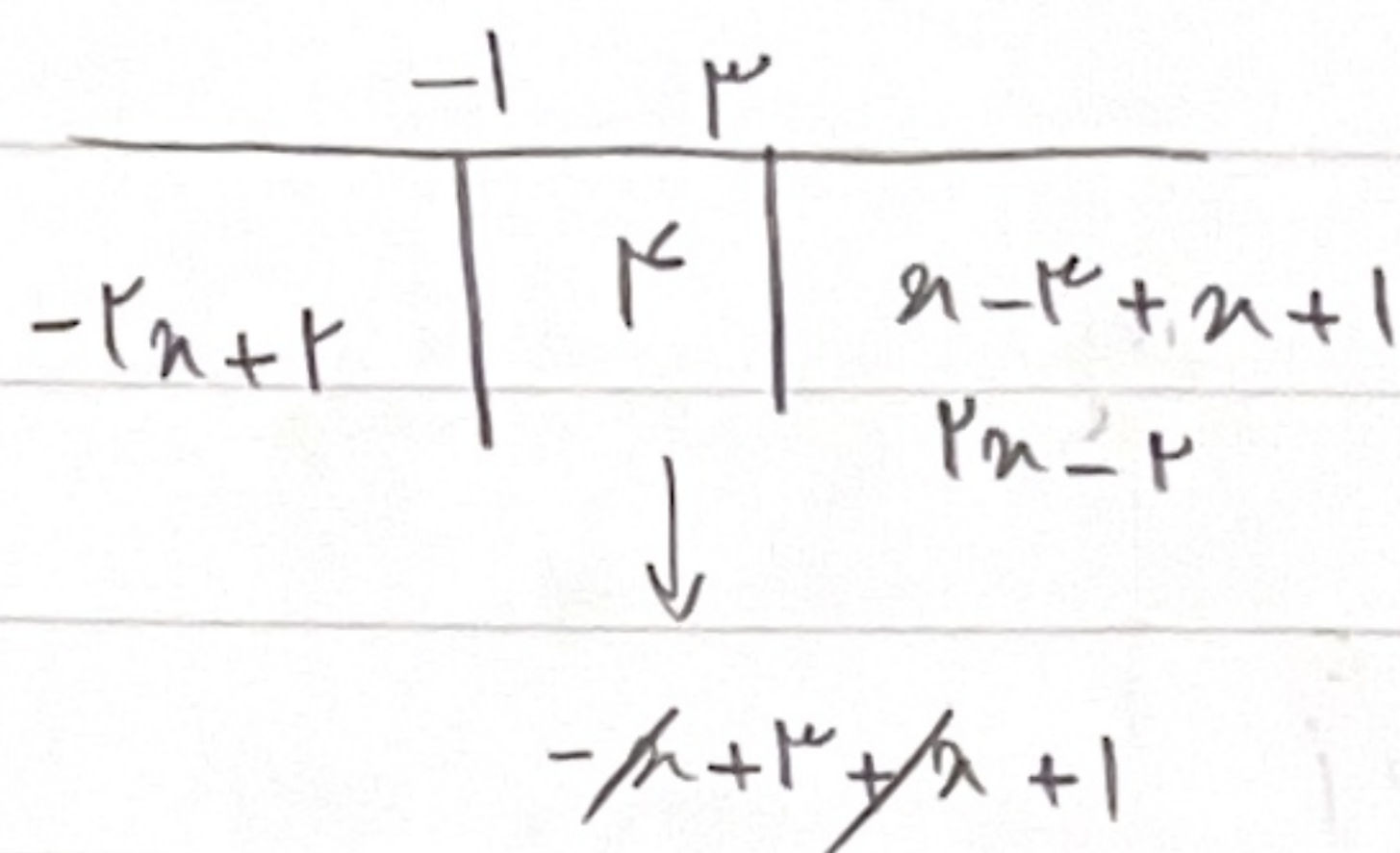
$$R_f = [-2, +\infty)$$



(4)

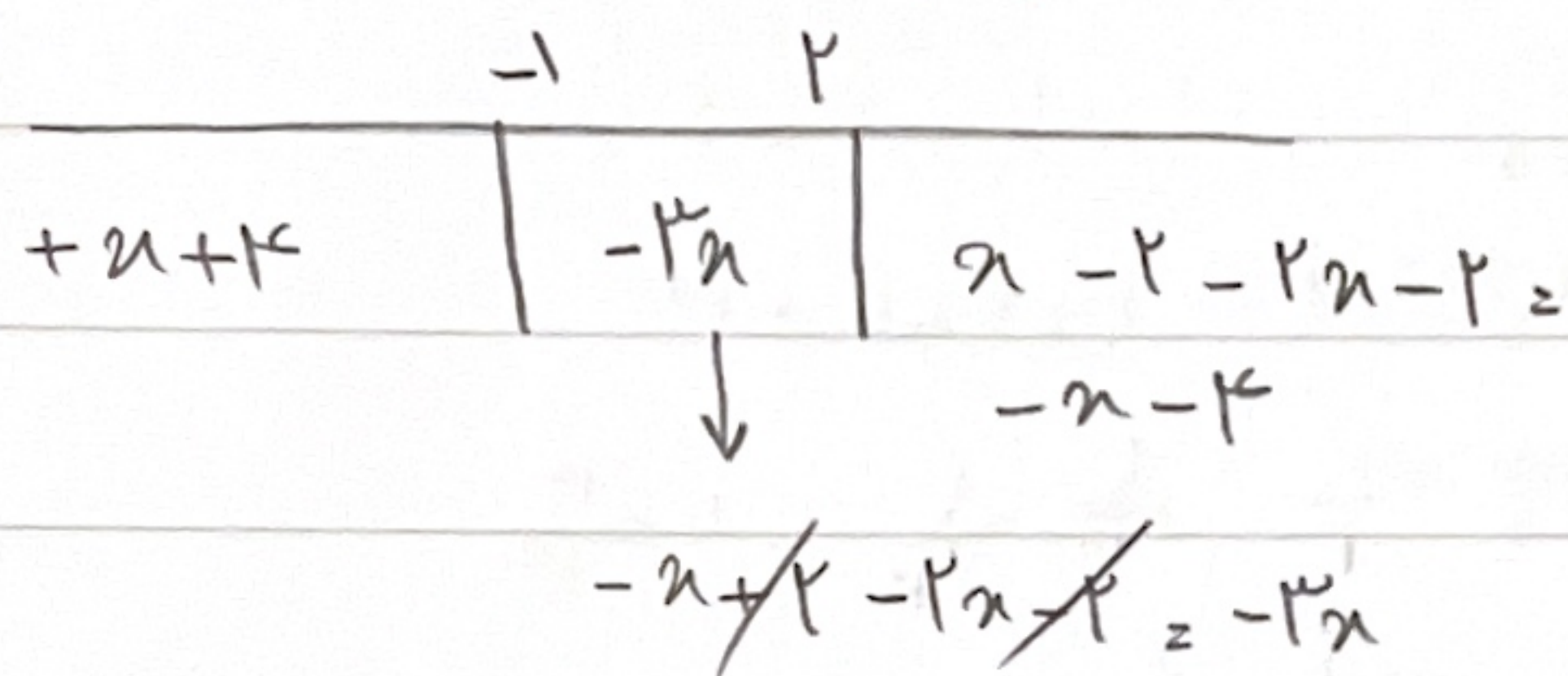
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ب) $y = |x-2| + |x+1|$

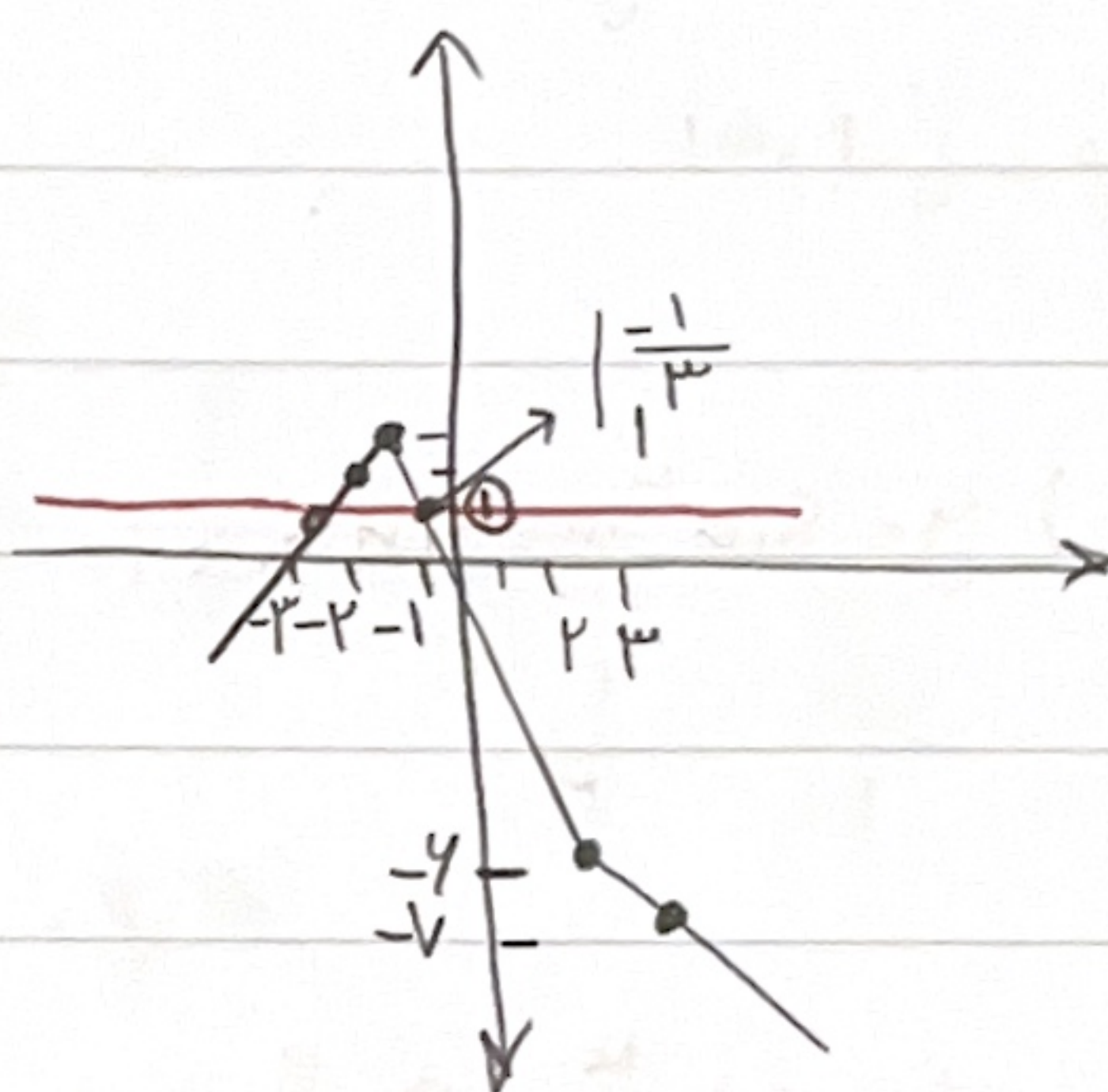


$R_f = [2, +\infty)$

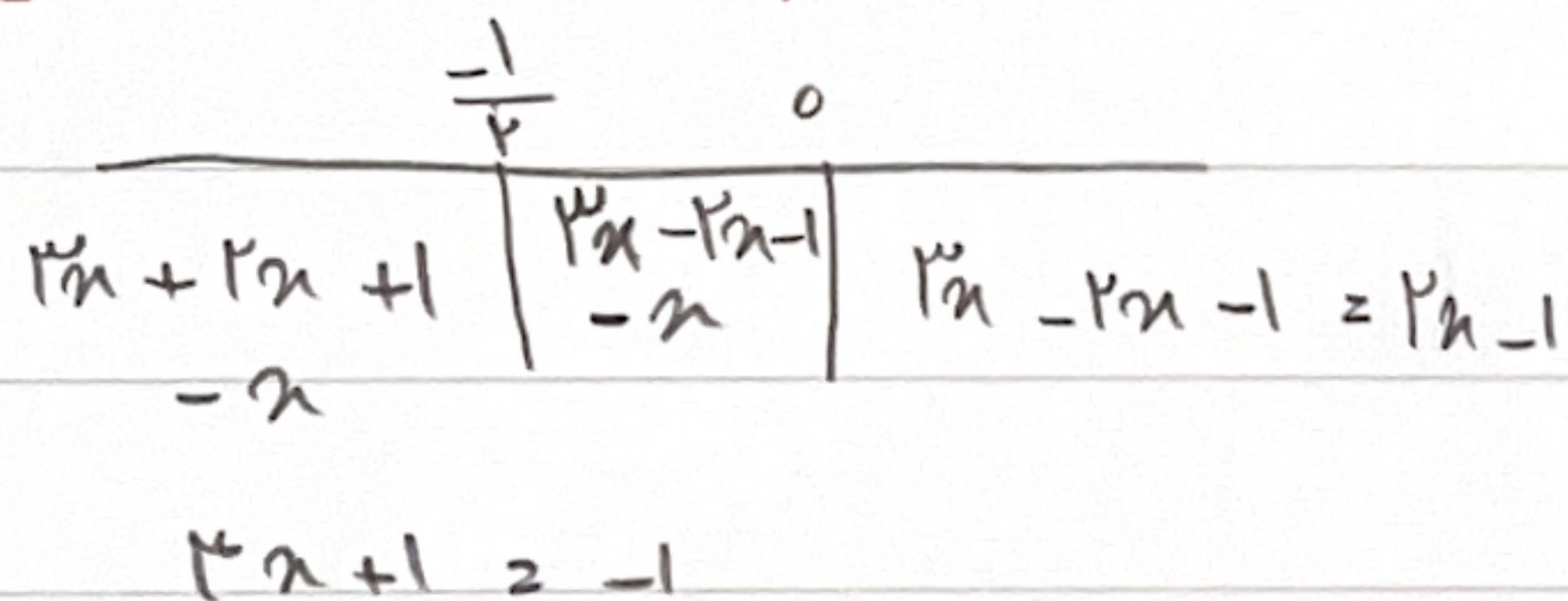
① $|x-2| - |2x+1| < 1$



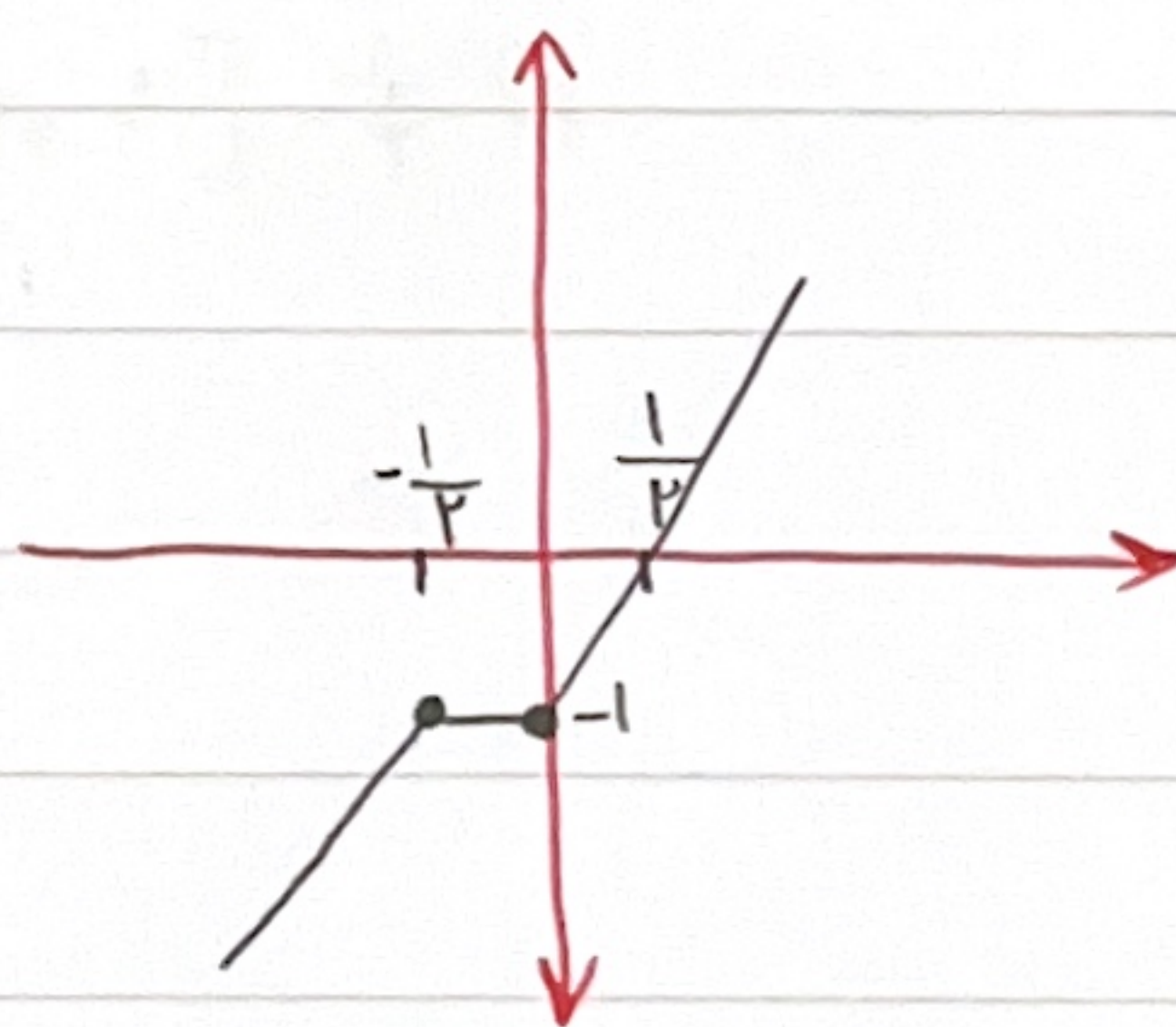
$R_f = \mathbb{R} - (-3, -\frac{1}{3})$



② $y = 2x - |2x+1| + |x|$

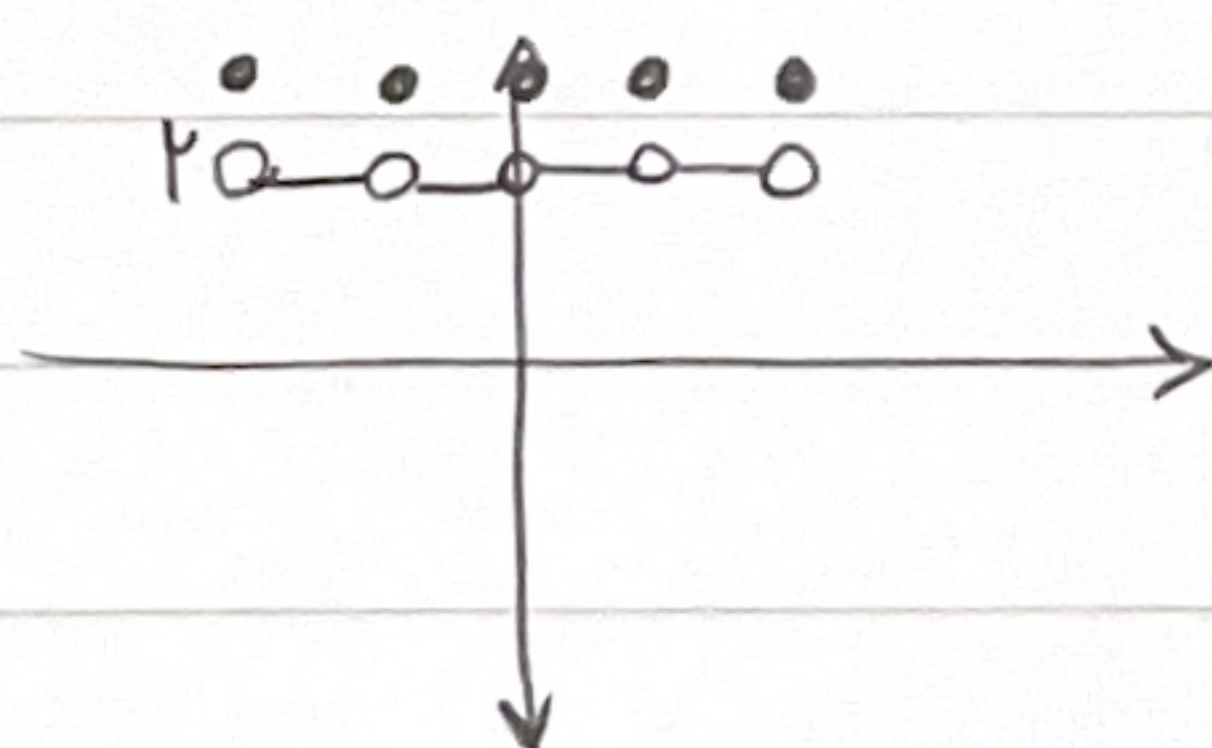


$R_f = \mathbb{R}$



الف) $y = [x] + [2-x] [x] + [-x] + 3$ ④

مثلاً $y = [x] + [-x]$ راسه واحد به سمت بالا انتقال می دهیم



$R_y = \{2, 3\}$

$$b) y = \lfloor x \rfloor - [x]$$

$$-1 \leq x < -1 \rightarrow [x] = -1$$

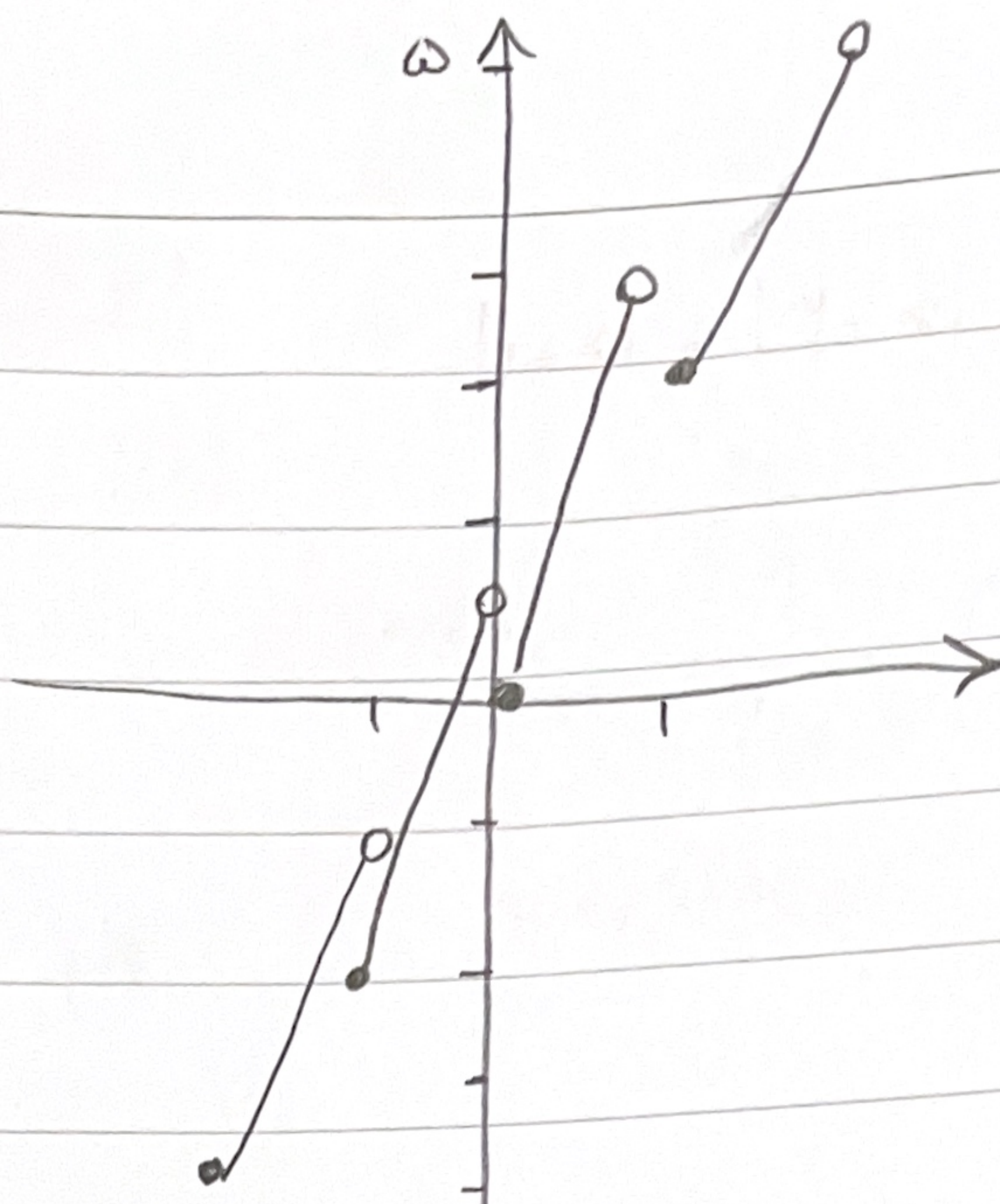
$$-1 \leq x < 0 \rightarrow [x] = -1$$

$$0 \leq x < 1 \rightarrow [x] = 0$$

$$1 \leq x < 2 \rightarrow [x] = 1$$

$$x = 2 \rightarrow y = 2$$

$$R_f = [-1, \infty)$$



(10)

$$الف) y = \sin^2 x - \sin x + 1$$

$$\frac{-b}{2a} = \frac{1}{2}$$

$$R_f = \left[\frac{1}{2}, 2 \right]$$

$$\sin^2 x \geq 1$$

$$1 - 1 + 1 = 1$$

$$\sin^2 x = 1$$

$$1 + 1 + 1 = 3$$

$$\sin^2 x = \frac{1}{2}$$

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

$$ب) y = \sin^2 x + \sin^2 x + 1$$

$$\frac{-b}{2a} = -\frac{1}{2}$$

$$R_f = [1, 2]$$

$$\sin^2 x = 0$$

$$0 + 0 + 1 = 1$$

$$\sin^2 x = 1$$

$$1 + 1 + 1 = 3$$

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

x