

①

۱۷، ۷۵

اینارایم زاده - تظیف ۵ - داور هم اضر ب

$$y = \frac{|x|+1}{|x|-1} \rightarrow |x| = \frac{y+1}{y-1} \quad \begin{array}{c} -\frac{1}{1} \\ + \quad - \quad + \\ 0 \quad 0 \end{array} \rightarrow R_y = (-\infty, -1] \cup (1, +\infty)$$

②

$$y = \frac{x^2+1}{|x|} = |x| + \frac{1}{|x|} \rightarrow R_y = [2, +\infty)$$

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

②

$$\rightarrow x = \frac{y-1 \pm \sqrt{(y-1)^2 + 4(1-y)}}{2} \geq 0 \rightarrow y^2 - 4y + 4 + 1 - 4y \geq 0$$

$$\begin{array}{c} -4 \quad -1 \\ + \quad - \quad + \\ 0 \quad 0 \end{array}$$

$$y^2 - 8y + 5 \geq 0 \rightarrow (y-1)(y-5) \geq 0$$

$$\rightarrow R_y = \mathbb{R} - (-5, 1)$$

$$f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1} = y \rightarrow D_f = \mathbb{R} \quad \text{چرا؟}$$

③ ①

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

$$y \neq 1 \rightarrow x = \frac{y-1 \pm \sqrt{(1-y)^2 - 4(y-1)(y-\frac{1}{x})}}{2(y-1)} \geq 0 \rightarrow y^2 - 2y + 1 - 4y^2 - 1 + 4y \geq 0$$

$$\hookrightarrow 3y^2 - 3y \leq 0 \rightarrow (y-\sqrt{3})(y+\sqrt{3}) \leq 0$$

$$3y(y-1) \leq 0$$

$$y=1 \rightarrow x^2 - x + 1 = x^2 - x + \frac{1}{x} \rightarrow 1 \neq \frac{1}{x} \quad \text{عق}$$

$$\begin{array}{c} -\sqrt{3} \quad \sqrt{3} \\ + \quad - \quad + \\ 0 \quad 0 \end{array}$$

پس $y=1$ تو برد نیست!

صفحه آخر...

$$R_f = [\sqrt{3}, \sqrt{3}]$$

الف) $y = \sqrt{-x^2 + 4x - 1}$

$\hookrightarrow \frac{-b}{2a} = \frac{-4}{-2} = 2 \leadsto \sqrt{-4 + 16 - 1} = \sqrt{11}$

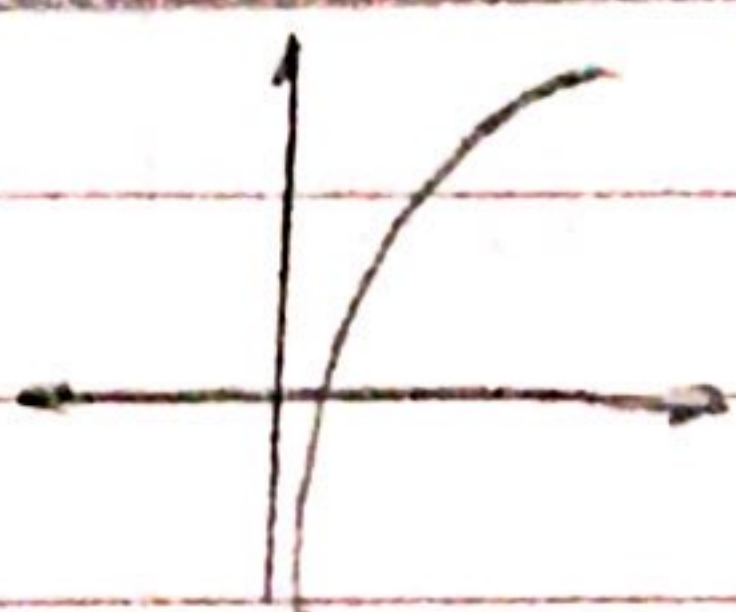
$\rightarrow R_y = [0, \sqrt{11}]$ (۲)

ب) $y = \sqrt[3]{x^2 - 16x}$

$\frac{-b}{2a} = \frac{16}{2} = 8 \rightarrow (-8)$

$R_y = [-8, +\infty)$

الف) $y = \log(x^2 - x + 16) > 0$



$\rightarrow R_y = \mathbb{R}$

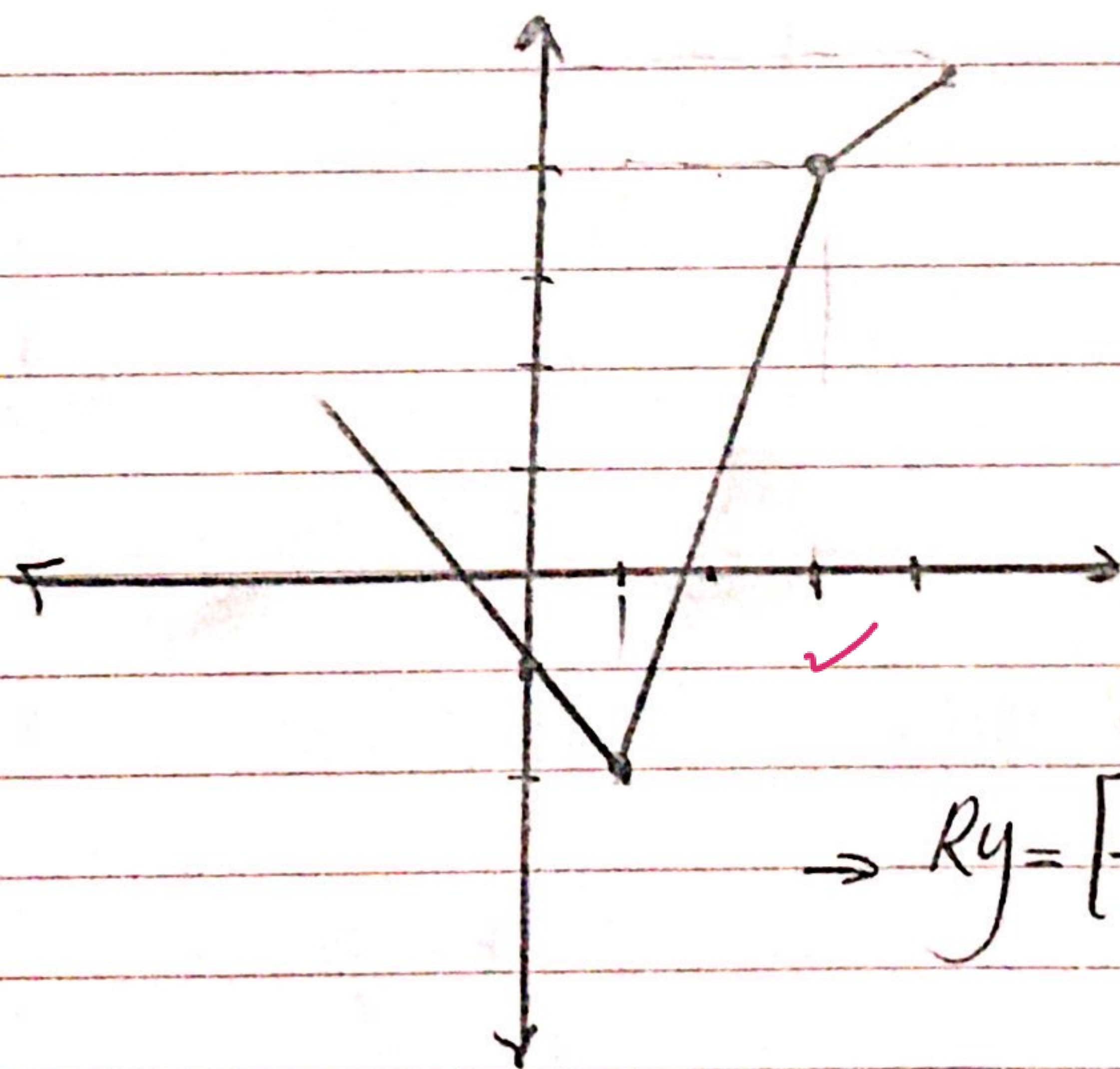
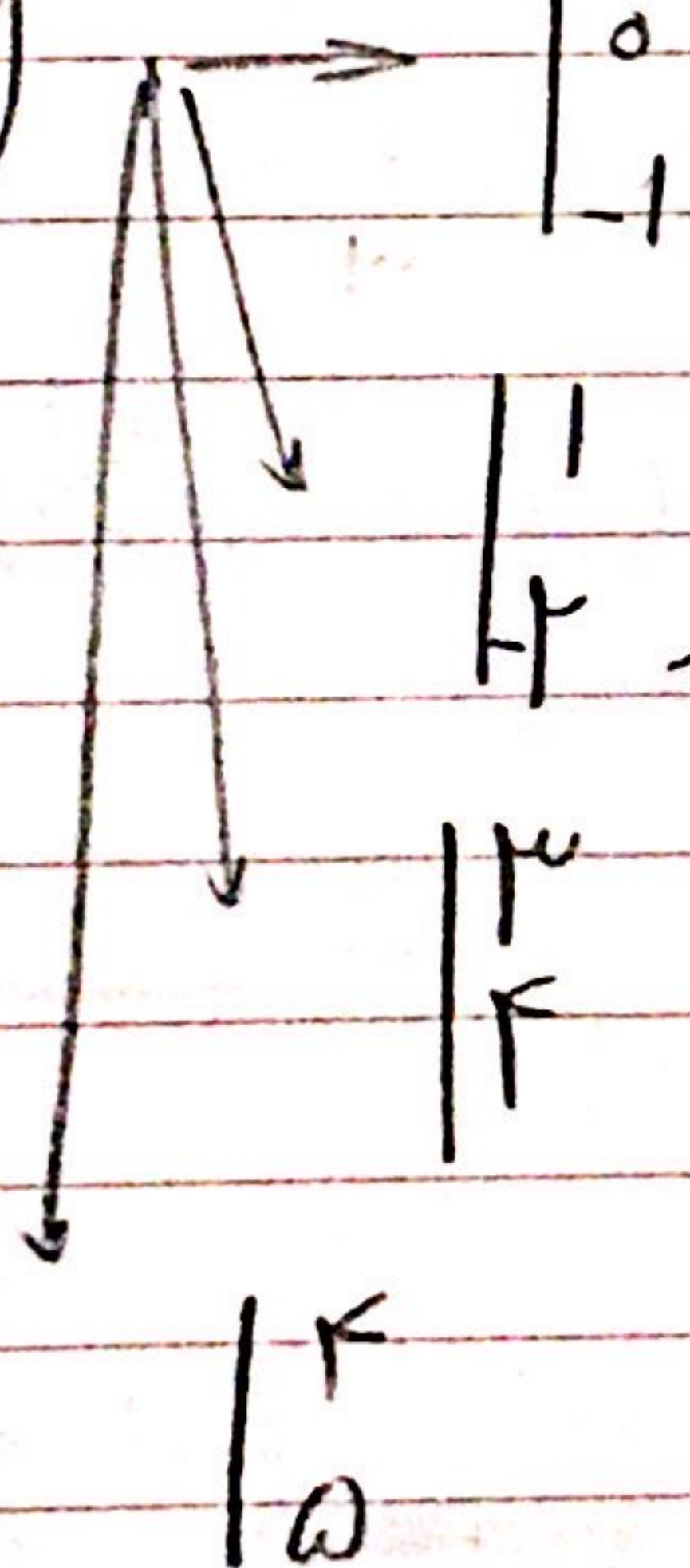
(۲) (۱)

ب) $y = \log\left(\frac{x^2+1}{x}\right)$

$\rightarrow \frac{x^2+1}{x} > 0 \rightarrow x > 0 \rightarrow x + \frac{1}{x} \geq 2 \leadsto \log 2 = 1$

$\log + \infty = +\infty \rightarrow R_y = [1, +\infty)$

الف) $|x-1| - |x-4| = y$



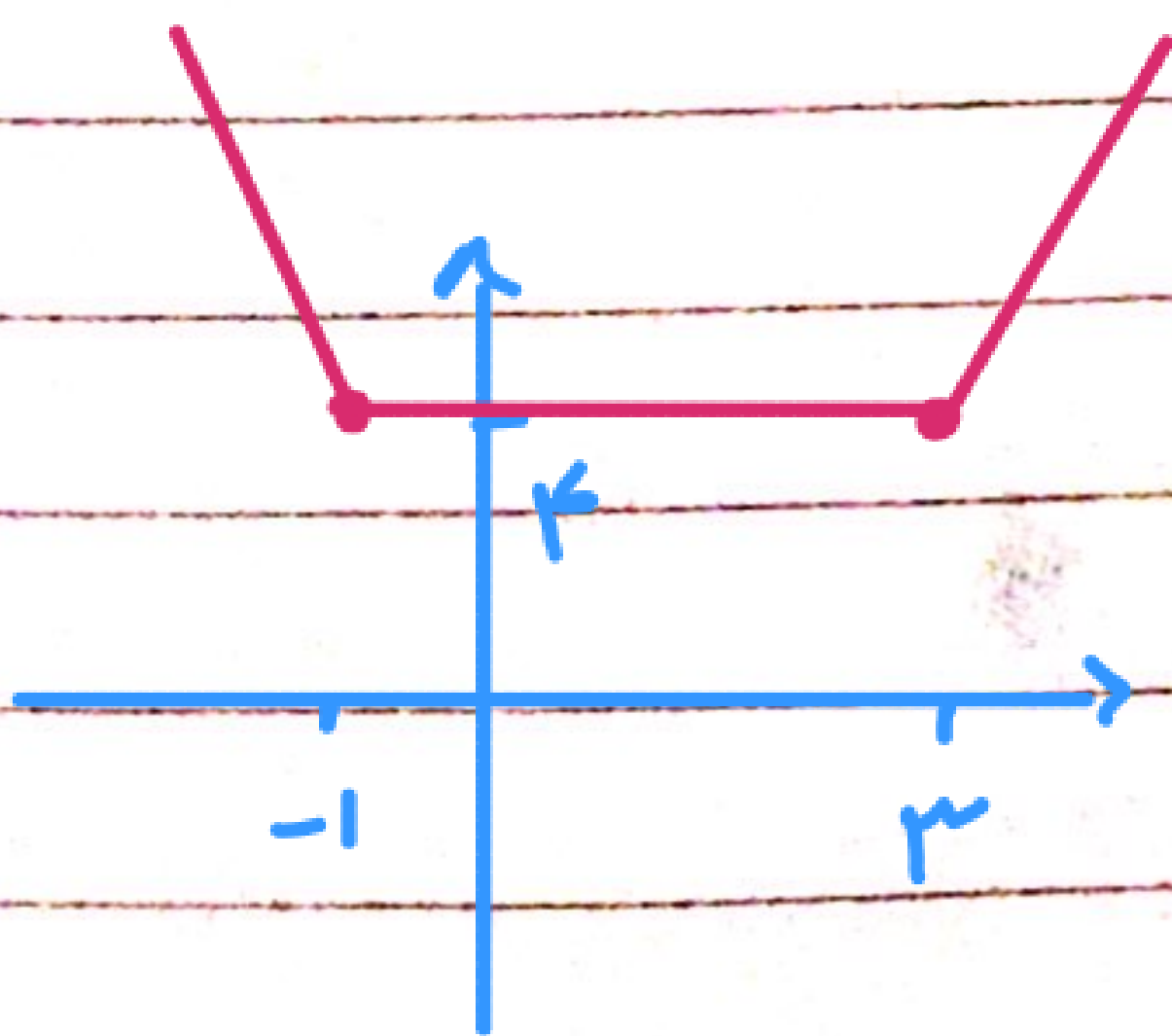
$\rightarrow R_y = [-2, +\infty)$

(۱) (۲)

ب) $y = |x-3| + |x+1| \leadsto$

$R_y = [4, +\infty)$

راه حل کامل!



تابع قطعه‌ای

$\rightarrow R_y = [4, +\infty)$

$$|x-2| - |x+2| \leq 1$$

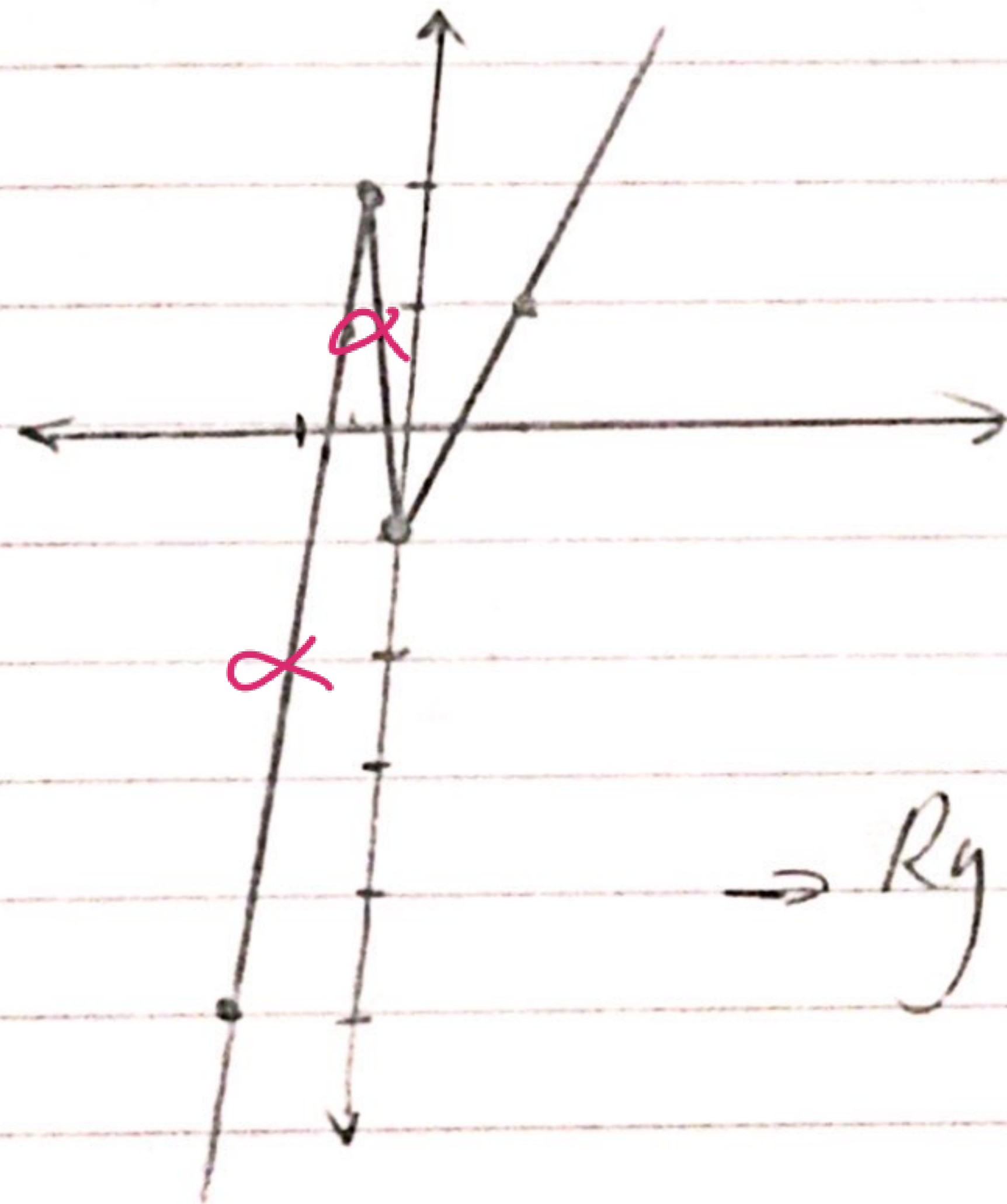
(٢) (٧)

$-x+2 \geq x+2$ $x+2 \leq 1$ $x \leq -1$	$-x+2 \leq x-2$ $-1 \leq x$ $x \geq -1$	$x-2 \leq x-2 = -x-2 \leq 1$ $-1 \leq x$ ✓
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$$\rightarrow (-\infty, -1] \cup [-1, +\infty)$$

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

Graph of the function $y = |x| - |x+1| + |x|$ is shown, with key points marked at $x = -1$ and $x = 0$.



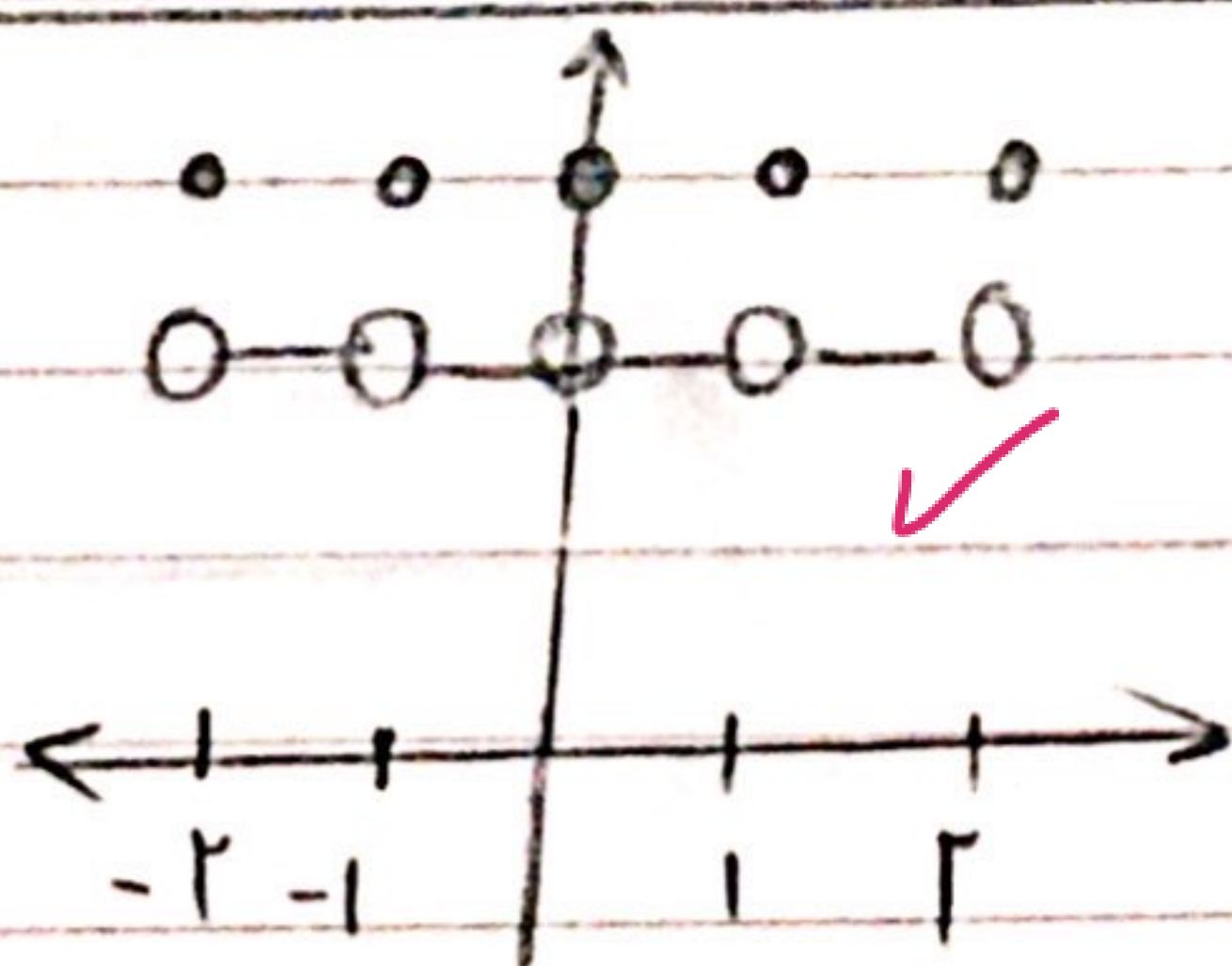
$$\rightarrow R_y = \mathbb{R}$$

صفحه آخر...

(٨) (٢, ٥)

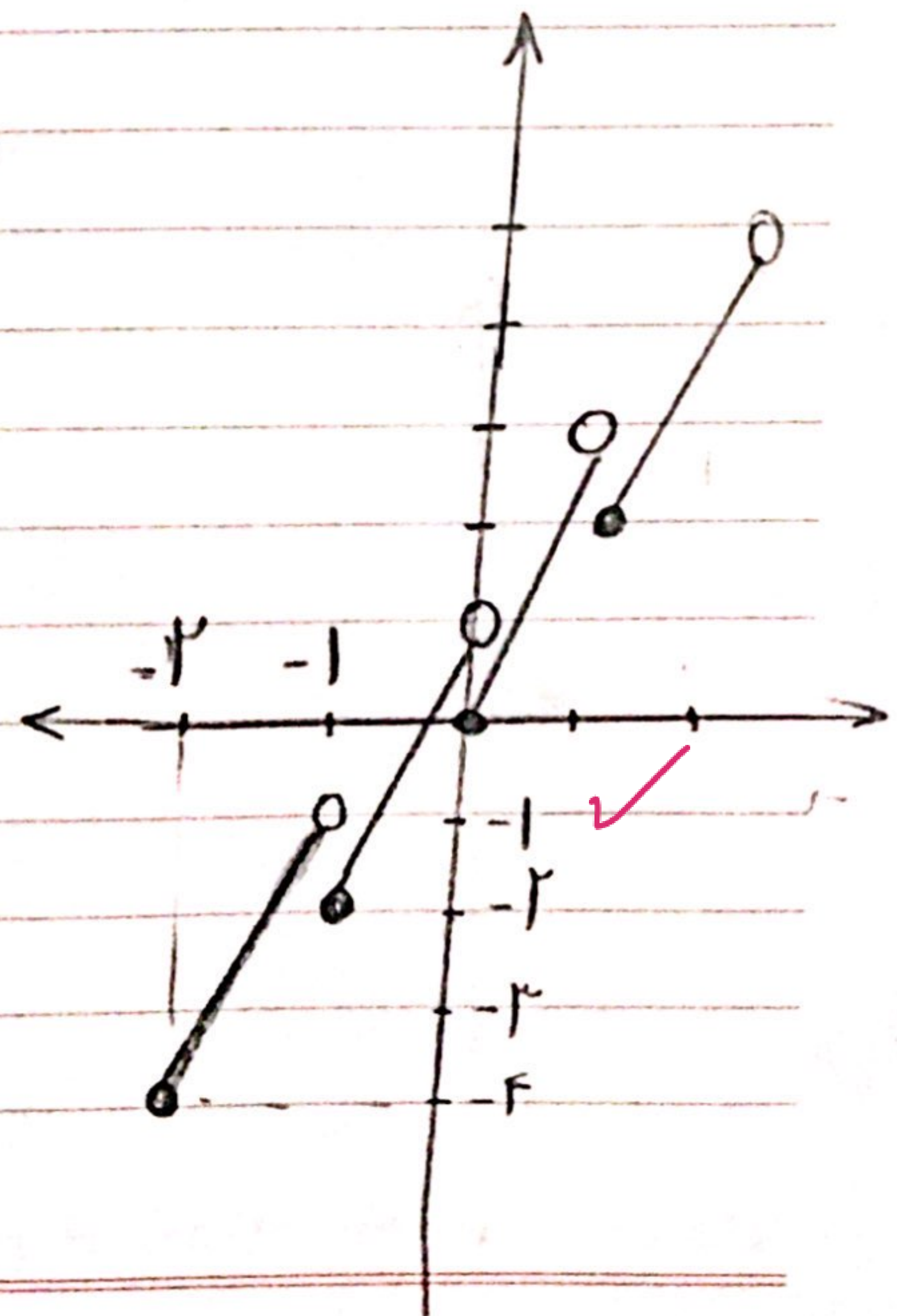
$$و) [x] + [-x] + 1 = y$$

$$\hookrightarrow R_y = \{1, 2\}$$



$$١) y = |x| - [x]$$

Graph of the function $y = |x| - [x]$ is shown, with key points marked at $x = -1$ and $x = 0$.



$$R_y = [-1, 1]$$

جواب



$$الف) y = \sin^2 - \sin + 1 \quad \xrightarrow{1} 1 - 1 + 1 = 1$$

$$\xrightarrow{-1} 1 + 1 + 1 = 3$$

$$\xrightarrow{-\frac{b}{2a}} \frac{1}{4} - \frac{1}{4} + 1 = \frac{3}{4}$$

$$\rightarrow Rg = \begin{bmatrix} \frac{3}{4} & 9 & 3 \end{bmatrix} \quad (2)$$

$$ب) y = (\sin^2)^2 + \sin^2 + 1 \quad \xrightarrow{1} 1 + 1 + 1 = 3$$

$$\xrightarrow{0} 1$$

$$\rightarrow Rg = \begin{bmatrix} 1 & 9 & 3 \end{bmatrix}$$

$$\xrightarrow{-\frac{b}{2a} = -\frac{1}{2}} \text{عقار}$$

$$f(n) = \frac{(n - \frac{1}{r})^r}{(n - \frac{1}{r})^r + \frac{r}{r}}$$

۳- خروجی کسر همواره مثبت است پس دامنه IR است

طرفین درمیان $\rightarrow yn^r - yn + y = n^r - n + \frac{1}{r} \rightarrow (y-1)n^r - (y-1)n + y - \frac{1}{r} = 0$

$$n = \frac{y-1 \pm \sqrt{(y-1)^2 - 4(y-1)(y-\frac{1}{r})}}{2(y-1)} \rightarrow \Delta \geq 0 \rightarrow (y-1)(y-1-\frac{r}{r}y+1) \geq 0$$

$$\frac{0}{-} \mid \frac{1}{+} \Rightarrow y = [0, 1]$$

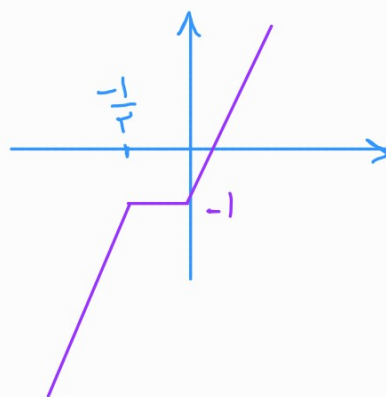
غیرب n بنایه صفر شود یعنی $y \neq 1$ است

و تابع در انزای هیچ مقداری برابر یک نمی شود پس برد برابر است با: $R_y = [0, 1)$

می توانست از روش مربع هم استفاده کنی

$$f(n) = \frac{\square^r}{\square^r + \frac{r}{r}}$$

$$y = \begin{cases} r_{n-1} & n \geq 0 \\ -1 & -\frac{1}{r} < n < 0 \\ r_{n+1} & n \leq -\frac{1}{r} \end{cases}$$



$$R_y = \mathbb{R}$$

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