

① مارکس $|x-1| = \frac{1}{x-1}$ ضرر داره؟ بکرسه $x=2$

$\frac{1}{x-1} = \frac{1}{x-1}$
 $\Rightarrow (x-1)^2 = 1$
 $\Rightarrow |x-1| = 1 \Rightarrow x-1 = 1 \Rightarrow x=2$
 $-1 \Rightarrow x-1 = -1 \Rightarrow x=0$
 این با فرض $x > 1$ نیست
 پس $x=0$

الف) $\left| \frac{x-1}{x} \right| < 2 \Rightarrow -2 < \frac{x-1}{x} < 2 \Rightarrow \frac{x-1}{x} - \frac{x}{x} < 0$
 $\frac{-1}{x} < 0 \Rightarrow \frac{1}{x} > 0$
 $x > 0$

این حالت را نیز در نظر بگیر
 $\frac{x-1}{x} > 2$
 $\frac{x-1}{x} - \frac{2x}{x} > 0$
 $\frac{-x-1}{x} > 0$
 $\frac{-x-1}{x} < 0$

② $-2 < \frac{x-1}{x} \Rightarrow x < \frac{x-1}{x} + \frac{x}{x} \Rightarrow x < \frac{x-1}{x} + 1$
 $x > 0 \cap \left[(-\infty, 0) \cup \left(\frac{1}{x}, +\infty \right) \right]$
 $\Rightarrow \left(\frac{1}{x}, +\infty \right)$

ب) $\left| \frac{x-2}{x+1} \right| < 1$
 $\frac{x-2}{x+1} > 1$
 $\frac{x-2}{x+1} < -1$
 $\frac{x-2}{x+1} + \frac{x+1}{x+1} > 0$
 $\frac{x-2}{x+1} + \frac{x+1}{x+1} < 0$
 $\frac{x-2}{x+1} + \frac{x+1}{x+1} = \frac{x-1}{x+1} < 0$

$\left(-3, \frac{1}{x} \right) = \left(-\frac{1}{x}, \frac{1}{x} \right)$

$\left(-\frac{1}{x}, \frac{1}{x} \right)$

$$\alpha = \frac{1}{2}$$

$$|x - \alpha| < \beta \quad \leftarrow \quad x^2 < 1 + y \quad (2)$$

$$-\beta < x - \alpha < \beta$$

$$\alpha - \beta < x < \alpha + \beta$$

$$\alpha - \beta = -1$$

$$\alpha + \beta = 3$$

$$2\alpha = 1 \Rightarrow \alpha = \frac{1}{2}$$

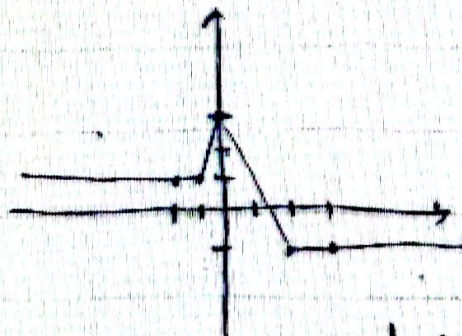
$$\beta = \frac{5}{2}$$

$$\begin{aligned} x^2 &< x - y & x^2 &< x + y \\ x^2 + y + y &< x - y & \Rightarrow x^2 - x - y &< 0 \\ \Delta &= 1 - 4 \times 1 \times y & (x - 2)(x + 2) &< 0 \\ \Delta &< 0 & & \\ \text{مقدار مثبت} & & & \\ \text{مربع صواب} & & & \\ \alpha & & & \end{aligned}$$

$$|x - \frac{1}{2}| < \frac{5}{2}$$

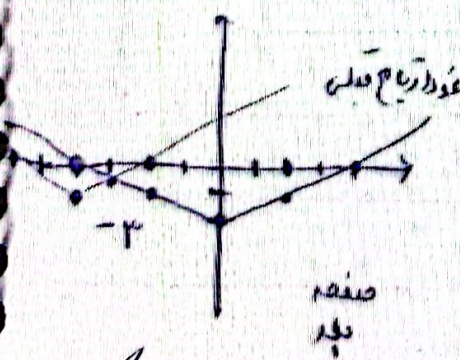
$$(3) \text{ مجموع سیرین و سیرین معکوس } y = |x+1| - |2x| + |x-2|$$

x	-1	-1/2	0	2	3
y	1	1	3	-1	-1



$$\begin{aligned} & \begin{array}{c|c|c} -1 & 0 & 2 \\ \hline x+1 & x+1 & x+1 \\ +2x & -2x & -2x \\ -x+2 & -x+2 & -x+2 \\ \hline -x+1 & -x+1 & -x+1 \end{array} \\ & \begin{array}{c} -x+1 \\ -x+1 \\ -x+1 \end{array} \end{aligned}$$

$$= 1 + 3 = 4$$



$$(4) \quad |x - \frac{1}{2}| = 2$$

$$|\frac{1}{2}(x+4)| = 2+1$$

$$|\frac{1}{2}x + 2| = 3 \Rightarrow \frac{1}{2}x + 2 = 3 \text{ or } \frac{1}{2}x + 2 = -3$$

$$\frac{1}{2}x = 1 \text{ or } \frac{1}{2}x = -5$$

Arman

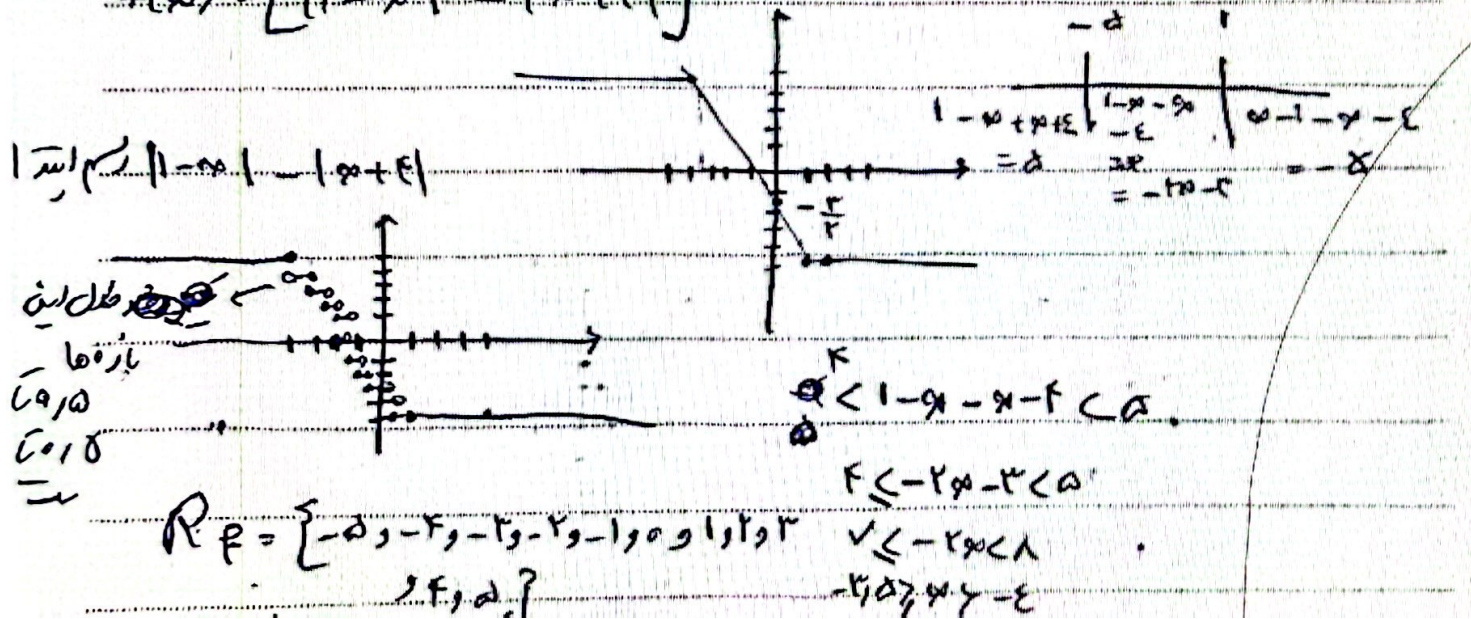
$$|\frac{1}{2}x| > 2 = |\frac{1}{2}x + 2| - 1 \Rightarrow |\frac{1}{2}x| - 1 = |\frac{1}{2}x + 2|$$

$$\begin{array}{l} -\frac{1}{2}x - 1 \\ = -\frac{1}{2}x - 2 \\ -1 = -2 \\ \text{جواب ندارد} \end{array} \quad \begin{array}{l} -\frac{1}{2}x - 1 \\ = \frac{1}{2}x + 2 \\ -3 = x \end{array} \quad \begin{array}{l} \frac{1}{2}x - 1 = \frac{1}{2}x + 2 \\ -1 = 2 \\ \text{جواب ندارد} \end{array}$$

در نقطه $x = 3$

برای تابع زیر

$$f(x) = [|1 - x| - |x + 4|]$$



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$$\therefore \frac{1}{x} - \left[\frac{x+1}{x} \right] = \frac{1}{x} - \left[1 + \frac{1}{x} \right] = \frac{1}{x} - \left[\frac{1}{x} \right] = 0$$

(4)

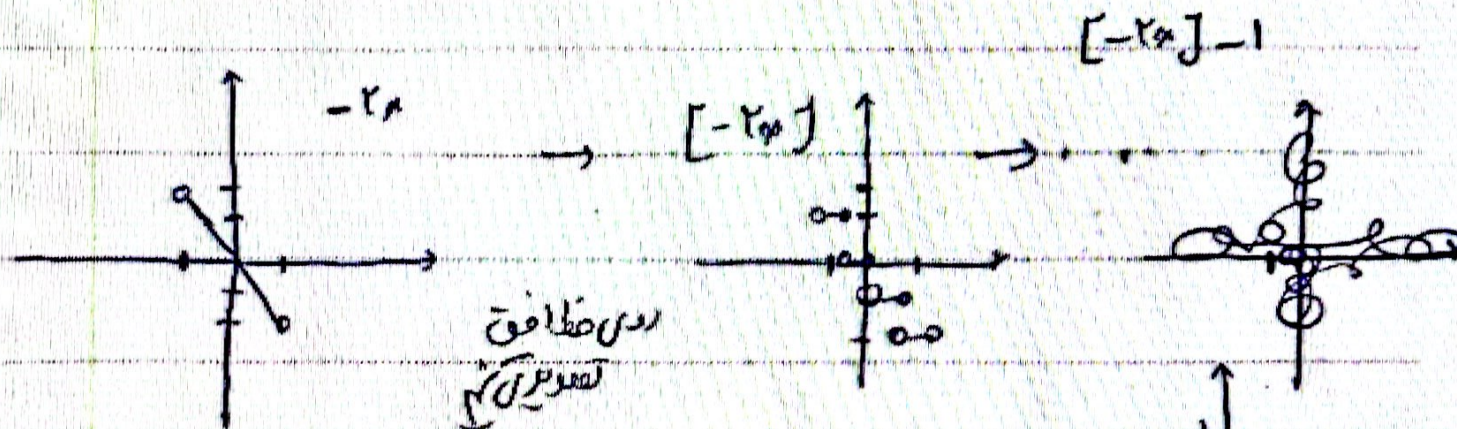
$$x \notin \mathbb{Z} \Rightarrow$$

$$\Rightarrow -1 < x < 0$$

$$R = [-1, 0)$$

الف) $x \in (-1, 1)$ $[-2\infty] - 1$

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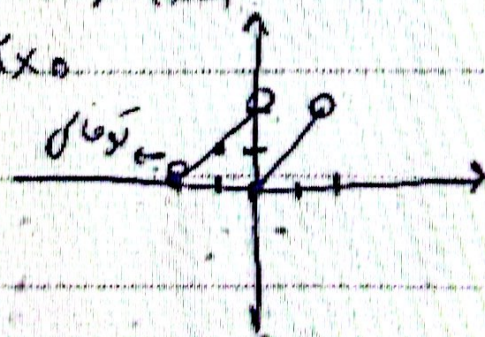


ب) $y = x - 2 \left\lfloor \frac{x}{2} \right\rfloor$ $x \in (-2, 2)$

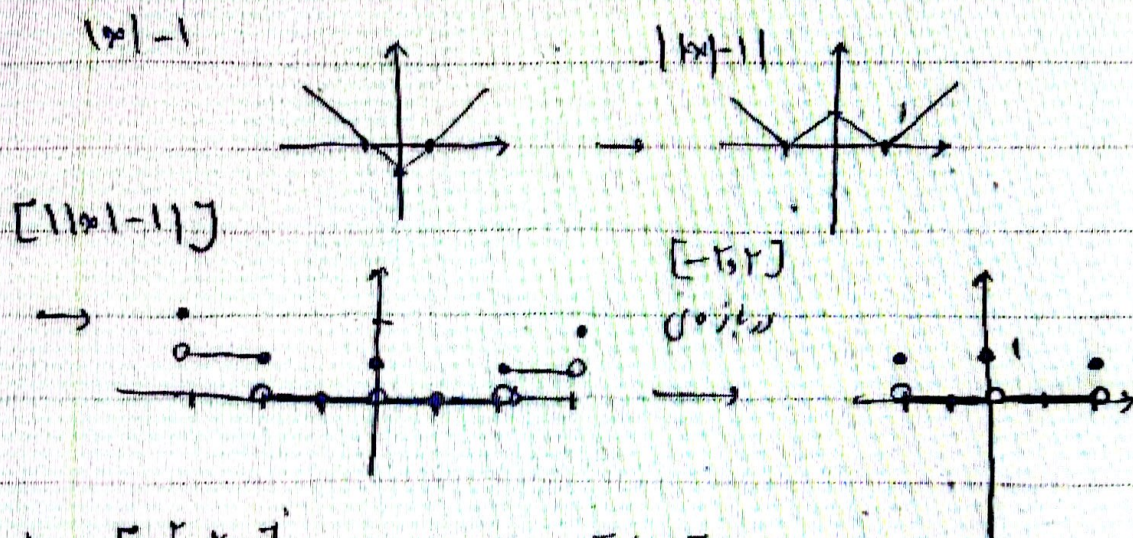
$(-2, 0) \rightarrow x + 2 \rightarrow x - 2x - 1$

$[0, 2) \rightarrow x - 2x - 0$

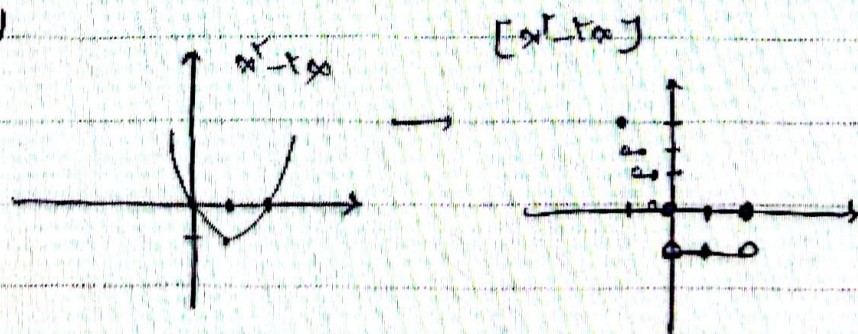
$\left\lfloor \frac{x}{2} \right\rfloor = 0$



$$y = [11x - 11] \quad x \in [-2, 2] \quad (7)$$



$$b) \quad [x^2 - 2x] \quad x \in [-1, 2]$$



$$a + b = 1/2 + 3/2 = 2 \quad b - [a] = 2, 4 \quad a + [b] = 2, 4 \quad (9)$$

$$b = 3/2$$

بہنہ خداداد
چون $[a]$ صحیح
چون $[b]$ صحیح

$$a = 1/2$$

چون $[a]$ صحیح
چون $[b]$ صحیح

$$[b - [a]] = 2 \quad [b] - [a] = 2 \quad [a + [b]] = 4$$

چون $[a]$ صحیح

$$[a] + [b] = 4$$

بہنہ خداداد

$$2[b] = 4 \quad [b] = 2$$

$$[b] = 2 \Rightarrow [a] = 1$$

Arman

$$(1 + \sqrt{2})^9 \text{ مجموع } (1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 19 \quad (1)$$

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$$[(1 + \sqrt{2})^4] = [19 - (1 - \sqrt{2})^4] = 19$$

$$1 < \sqrt{2} < 2 \Rightarrow 1 - \sqrt{2} < 0 \Rightarrow (1 - \sqrt{2})^4$$

$$((1 - \sqrt{2})^2)^2 = ((2 - 2\sqrt{2}))^2 = 9 - 4\sqrt{2}$$

$$((1 + \sqrt{2})^2)^2 = ((2 + 2\sqrt{2}))^2 = 9 + 4\sqrt{2}$$

$$\sqrt{2} = 1.4$$

$$[(1 + \sqrt{2})^4] = [19 - 9 + 4\sqrt{2}] = 10 + 4\sqrt{2}$$

المسألة