

بسم رب الذي خلق العصور



Subject: ستایش عرفانی زاده

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$$\frac{1}{x-1} = |x-1|$$

یک جواب دارد (1)

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

$$x(x-2) = 0 \Rightarrow \begin{cases} x=2 \text{ وقتی} \\ x=0 \text{ وقتی} \end{cases}$$

$$x < 1 : \frac{1}{x-1} = 1-x \Rightarrow -x^2 + 2x - 1 = 1$$

$$x^2 - 2x + 2 = 0 \quad \Delta < 0 \quad \text{ریشه ندارد}$$

الف

$$\left| \frac{2x-1}{x} \right| < 2$$

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

$$I: \frac{2x-1-2x}{x} < 0 \Rightarrow \frac{-1}{x} < 0 \quad x > 0$$

$$II: \frac{2x-1+2x}{x} > 0 \Rightarrow \frac{4x-1}{x} > 0 \quad \begin{matrix} + & - & + \\ 1 & - & 1 \end{matrix}$$

$$C: I \cap II = \left(\frac{1}{4}, +\infty \right)$$

ب

$$\left| \frac{x-2}{2x+1} \right| > 1$$

$$\Rightarrow \frac{x-2}{2x+1} > 1 \quad \text{I} \quad \frac{x-2}{2x+1} < -1 \quad \text{II}$$

$$I: \frac{x-2-2x-1}{2x+1} > 0 \Rightarrow \frac{-(x+3)}{2x+1} < 0 \quad \begin{matrix} - & + \\ 1 & - & 1 \end{matrix}$$

$$II: \frac{x-2+2x+1}{2x+1} < 0 \Rightarrow \frac{3x-1}{2x+1} < 0 \quad \begin{matrix} - & + \\ 1 & - & 1 \end{matrix}$$

$$C: I \cup II = \left(-3, \frac{1}{3} \right) - \left\{ -\frac{1}{2} \right\}$$



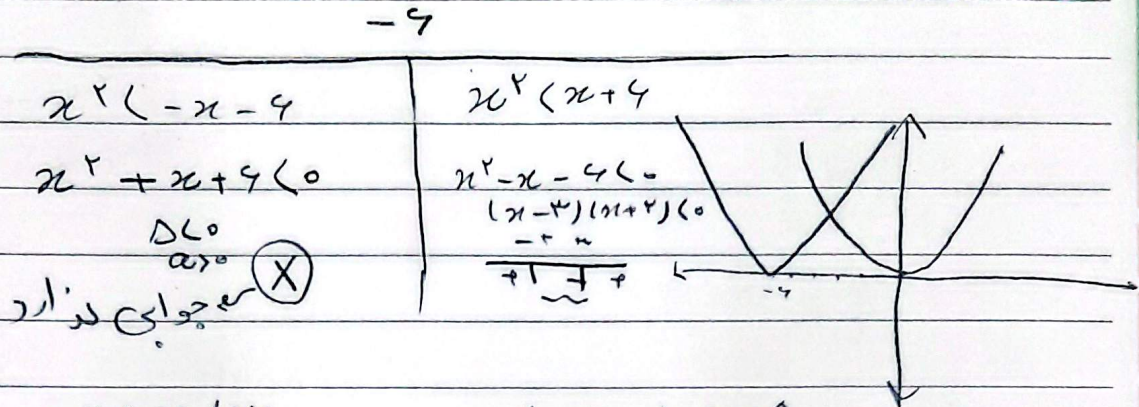
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$$x^2 < |x+4|$$

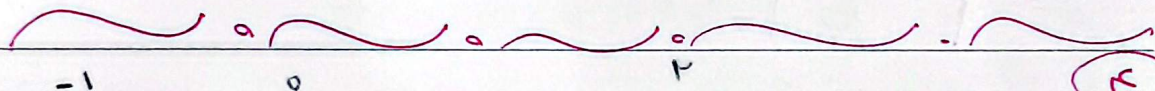
(3)



$$-2 < x < 3 \Rightarrow |x - \frac{1}{2}| < \frac{5}{2}$$

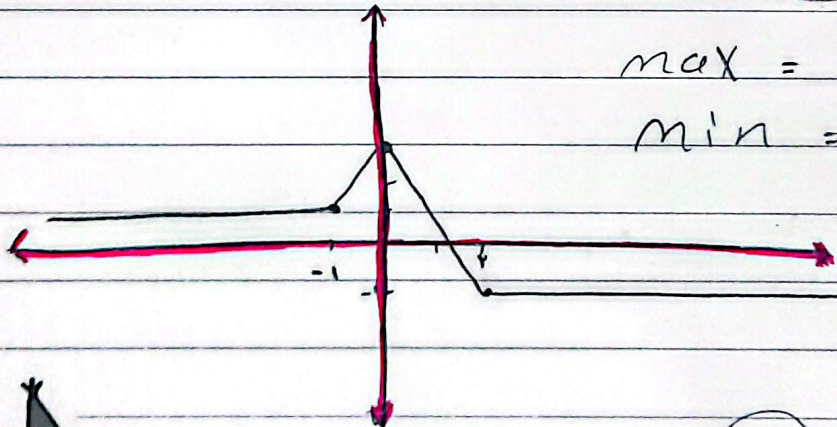
$$\alpha = +\frac{1}{2}$$

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



(4)

$-x-1+2x-x+2$	$x+1+2x-x+2$	$x+1-2x+2-x$	$x+1-2x+x-2$
1	3x+3	-x+3	-1
(1)	(3)	(1)	(-1)



$$\max = 3$$

$$\min = -1$$

$$\max + \min = 3 - 1 = (2)$$



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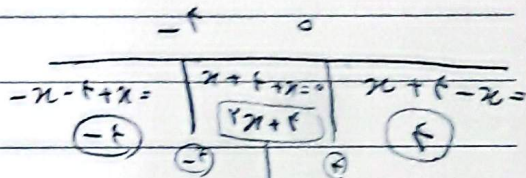


$$y = \frac{1}{2}|x| - 2 \leadsto \frac{1}{2}|x+4| - 2 + 1$$

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

برخورد در نقطه
(-4, -1)

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



$$|x+4| - |x| = -2$$

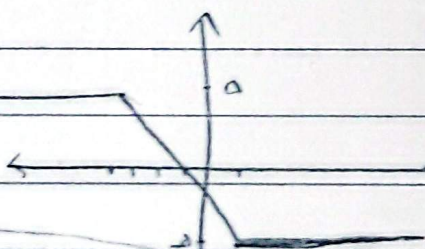
$$2x+4 = -2$$

$$x = -2$$

در بازه
مثبت و صحیح

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

سریع‌تر



$$R_f = \{-5, -4, -2, -1, 0, 1, 2, 3, 4, 5\}$$

$$f(x) = \frac{1}{x} - [1 + \frac{1}{x}] \quad \frac{1}{x} - [\frac{1}{x}] - 1$$

$$\frac{1}{x} - [\frac{1}{x}] \leadsto t - [t] \Rightarrow 0 \leq t - [t] < 1$$

$$-1 \leq t - [t] - 1 < 0 \Rightarrow -1 \leq f(x) < 0$$

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





الف) $[-2x] - 1$

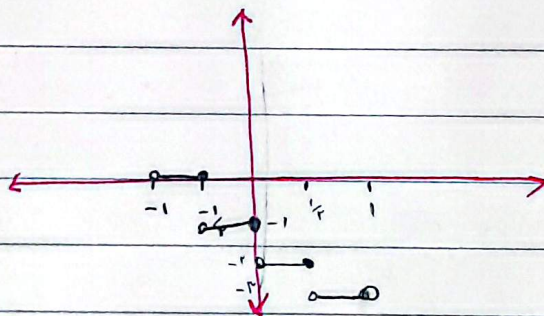
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$$-1 < x \leq -\frac{1}{2} \Rightarrow 1 \leq -2x < 2 \rightarrow [-2x] = 1 \rightarrow 1 - 1 = 0$$

$$-\frac{1}{2} < x \leq 0 \Rightarrow 0 \leq -2x < 1 \rightarrow [-2x] = 0 \rightarrow 0 - 1 = -1$$

$$0 < x \leq \frac{1}{2} \Rightarrow -1 \leq -2x < 0 \rightarrow [-2x] = -1 \rightarrow -1 - 1 = -2$$

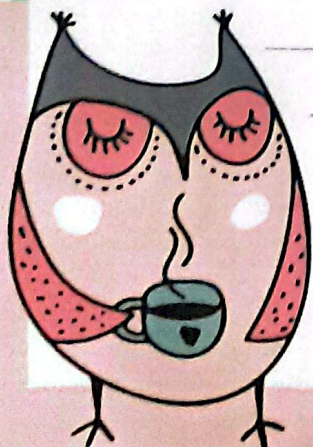
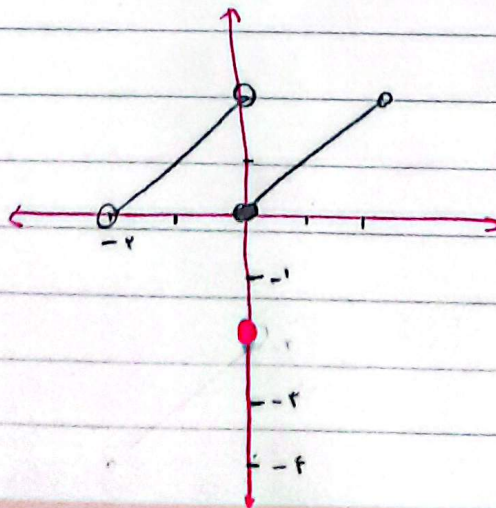
$$\frac{1}{2} < x < 1 \Rightarrow -2 \leq -2x < -1 \rightarrow [-2x] = -2 \rightarrow -2 - 1 = -3$$



ب) $y = x - 2 \left[\frac{x}{2} \right] \quad x \in (-2, 2)$

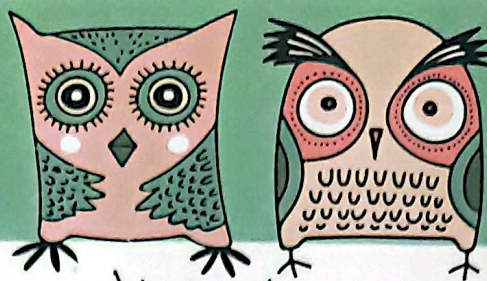
$$-2 < x < 0 \Rightarrow -1 < \frac{x}{2} < 0 \rightarrow \left[\frac{x}{2} \right] = -1 \Rightarrow x - 2(-1) = x + 2$$

$$0 \leq x < 2 \Rightarrow 0 \leq \frac{x}{2} < 1 \rightarrow \left[\frac{x}{2} \right] = 0 \Rightarrow x - 2(0) = x$$

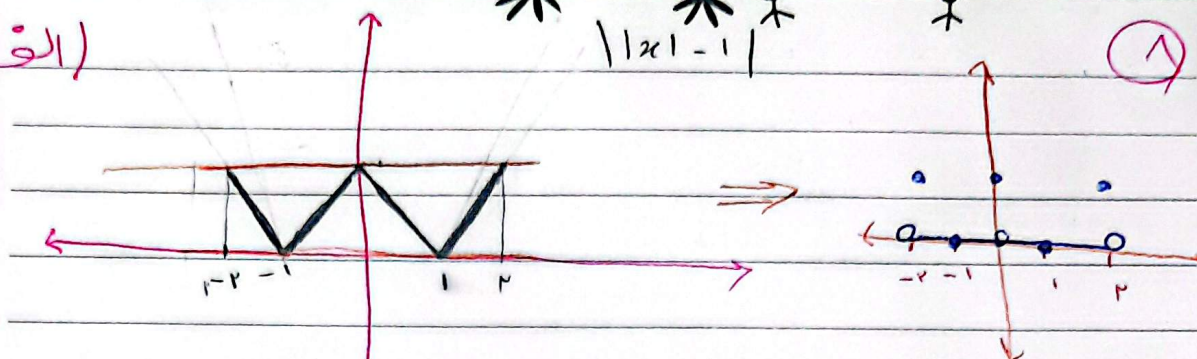


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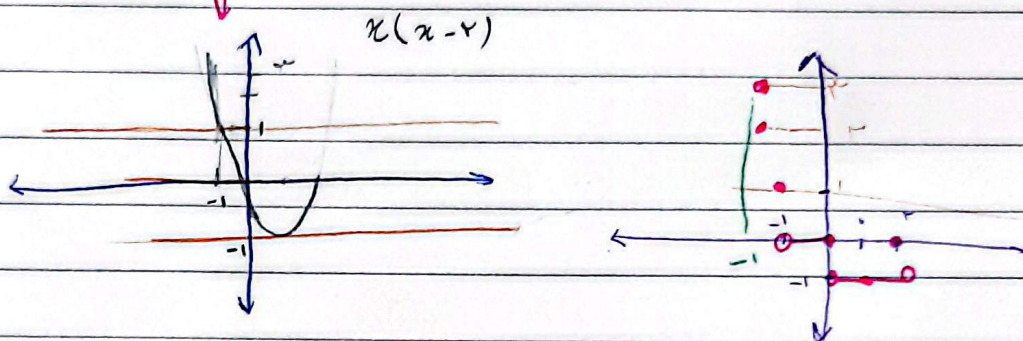
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الف)



ب)



$$b = t/4$$

$$a = k/2$$

$$k + t = 4$$

$$t - k = 2$$

$$\begin{cases} b = 3/4 \\ a = 1/2 \end{cases} \Rightarrow a + b = (4, 4) \Rightarrow \begin{cases} k = 1 \\ t = 3 \end{cases}$$

$$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 198$$

وقتی به توان $\Rightarrow$ عددی بین ۱- و ۰ است.

$$(1 + \sqrt{2})^4 = 197, \dots$$

$$[(1 + \sqrt{2})^4] = [197, \dots] = 197$$

