



Subject: ستایش عرفانی زاده

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

یک جواب دارد (۱)

$$x > 1 : \frac{1}{x-1} = x-1 \Rightarrow x^2 - 2x + 1 = 1 \Rightarrow x(x-2) = 0$$

$x = 2$  قبول  
 $x = 0$  غلط

$$x < 1 : \frac{1}{x-1} = 1-x \Rightarrow -x^2 + 2x - 1 = 1 \Rightarrow x^2 - 2x + 2 = 0$$

ریشه ندارد  
 $\Delta < 0$

الف

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

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

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

$$II: \frac{2x-1+2x}{x} > 0 \Rightarrow \frac{4x-1}{x} > 0$$

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

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

ب

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

$$\frac{x-2}{2x+1} > 1 \quad \vee \quad \frac{x-2}{2x+1} < -1$$

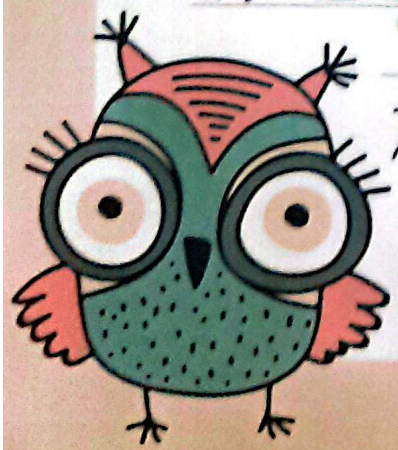
$$I: \frac{x-2-2x-1}{2x+1} > 0 \Rightarrow \frac{-(x+3)}{2x+1} < 0$$

$\frac{-}{+} \quad \frac{-}{-}$   
 $\frac{+}{+} \quad \frac{-}{-}$

$$II: \frac{x-2+2x+1}{2x+1} < 0 \Rightarrow \frac{3x-1}{2x+1} < 0$$

$\frac{-}{+} \quad \frac{+}{-}$   
 $\frac{+}{+} \quad \frac{-}{-}$

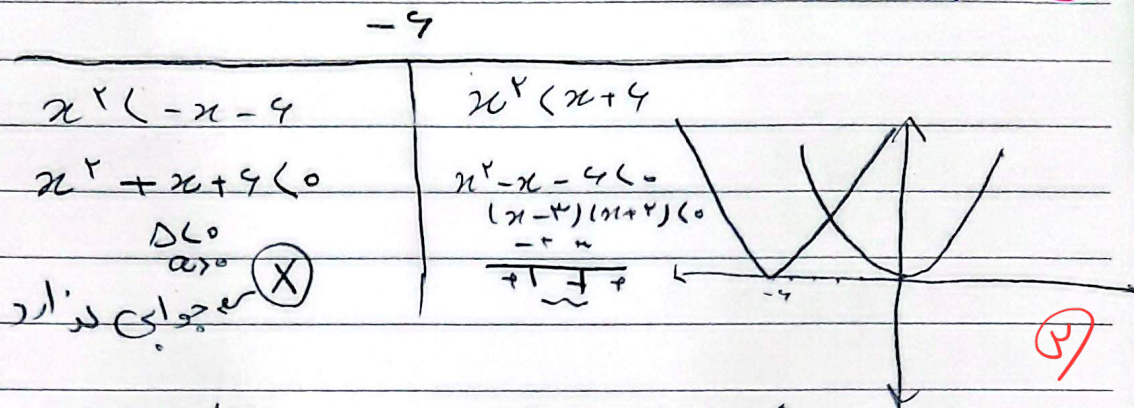
$$C: I \cup II = \left( (-\infty, -\frac{1}{2}) \cup \left\{ -\frac{1}{2} \right\} \right)$$





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

(3)



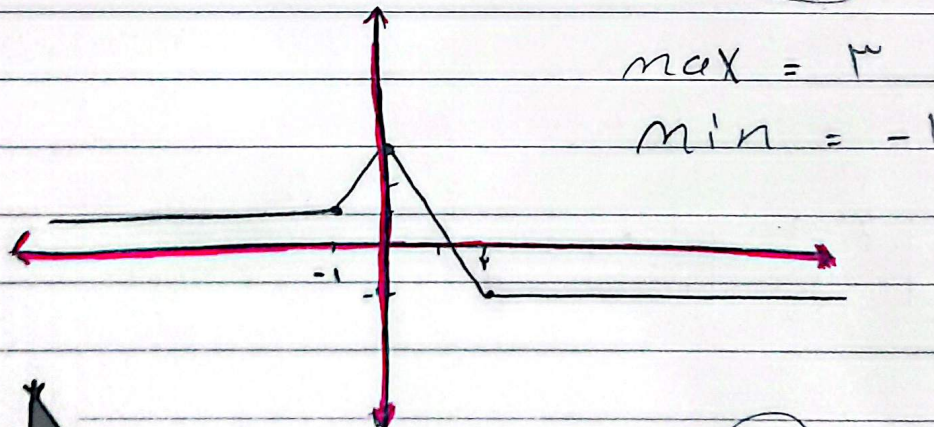
$$-2 < x < 3 \Rightarrow |x - \frac{1}{2}| < \frac{5}{2}$$

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

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



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



$$\text{Max} + \text{Min} = 3 - 1 = (2)$$



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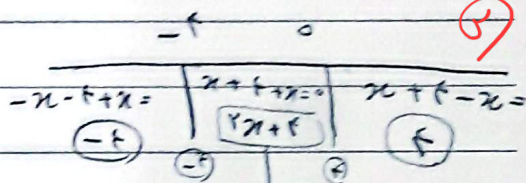


$$y = \frac{1}{2}|x| - 2 \leadsto \frac{1}{2}|x+4| - 2 + 1$$

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

برخورد در نقطه  
(-4, -1)

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



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

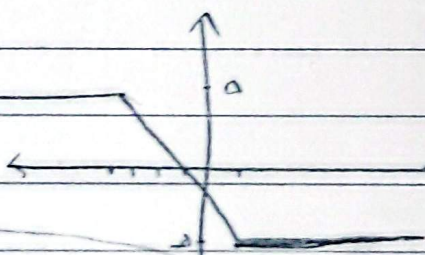
$$2x+4 = -2$$

$$x = -2$$

در بازه  
مثبت و صحیح

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

سریع‌تر



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

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

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

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

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





الف)  $[-2x] - 1$

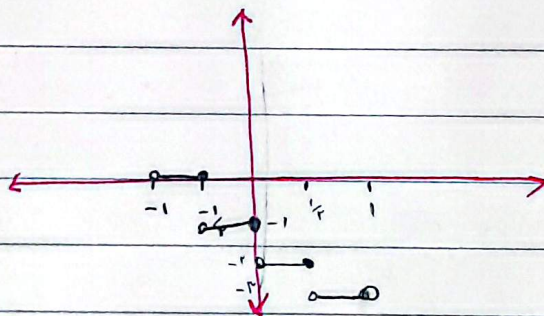
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$$-1 < x \leq -\frac{1}{2} \Rightarrow 1 \leq -2x < 2 \rightarrow [-2x] = 1 \rightarrow 1 - 1 = 0$$

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

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

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

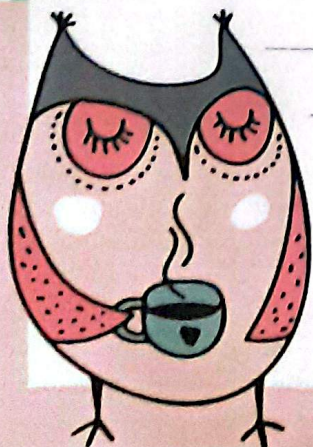
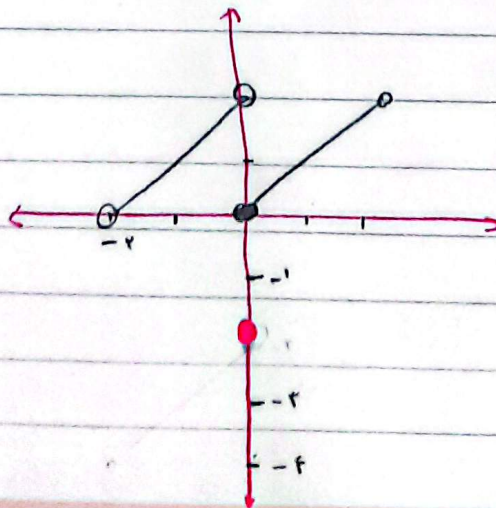


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ب)  $y = x - 2\left[\frac{x}{2}\right] \quad x \in (-2, 2)$

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

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

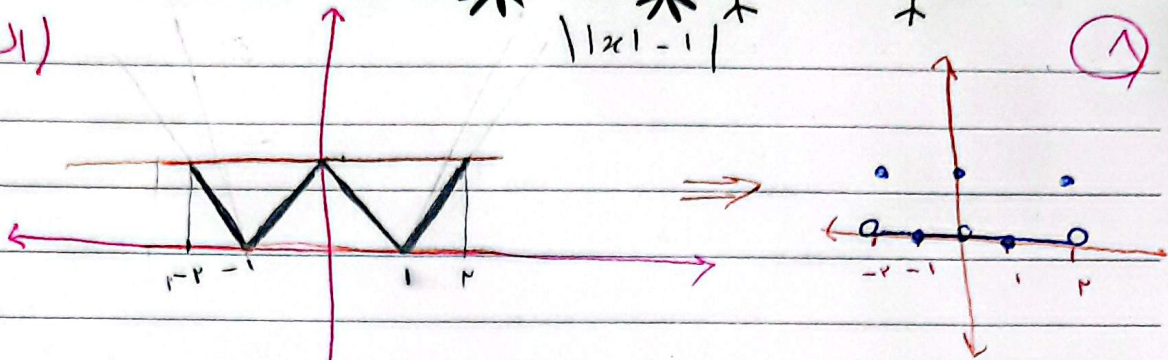


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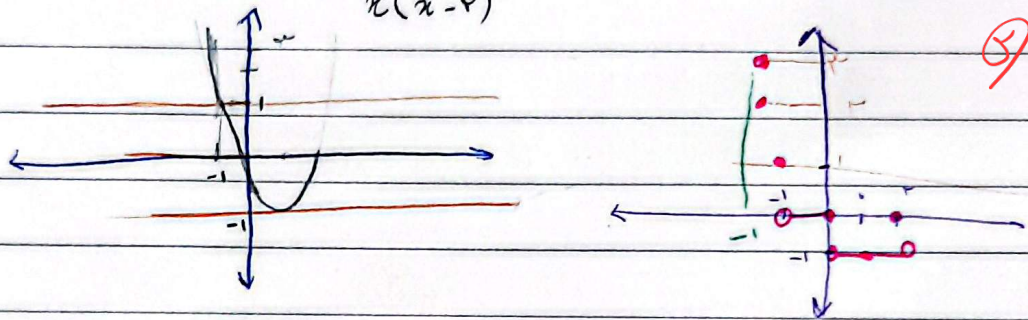


الف)



$x(x-2)$

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.

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

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

