

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

$$(x-1)^2 \rightarrow x-1=1 \rightarrow x=2 \checkmark$$

$$x-1=-1 \rightarrow x=0 \times$$

معادله یک جواب دارد

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

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

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

$$\textcircled{1} -2x < \frac{2x-1}{x} \Rightarrow 0 < \frac{2x-1+2x}{x}$$

$$\textcircled{2} \frac{2x-1}{x} < 2 \Rightarrow \frac{2x-1-2x}{x} < 0 \Rightarrow x < 0$$

$$(-\infty, 0) \Rightarrow \left(\frac{1}{2}, +\infty \right)$$

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

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

$$\frac{-x-3}{2x+1} > 0$$

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

$$\frac{-x-1}{2x+1} < 0$$

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

$$x^2 < |x+9| \Rightarrow |x-\alpha| < \beta \quad \alpha = -\frac{1}{2}$$

$$x^2 < x+9 \Rightarrow x^2-x-9 < 0 \Rightarrow (x-3)(x+2) < 0$$

$$-2 < x < 3$$

$$-x^2 > x+9 \Rightarrow -x^2-x-9 < 0 \Rightarrow \Delta < 0$$

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

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

$$x=-1 \rightarrow 0+2+3=5 \rightarrow \max$$

$$x=0 \rightarrow 1-0+2=3 \rightarrow -$$

$$x=2 \rightarrow 3-4=-1 \rightarrow \min$$

$$\omega = 1 = \begin{cases} x \geq 2 \rightarrow -1 \\ -1 < x < 2 \rightarrow -2x+3 \\ -1 < x < 0 \rightarrow 2x+3 \\ x < -1 \rightarrow 1 \end{cases}$$

$$\Rightarrow \text{Jmin} + \text{Jmax} = 3 + (-1) = 2$$

$$y = \left| \frac{1}{2}x \right| - 2 \xrightarrow[\text{انتقال}]{\text{بسیار}} \left| \frac{x}{2} + \varepsilon \right| - 1$$

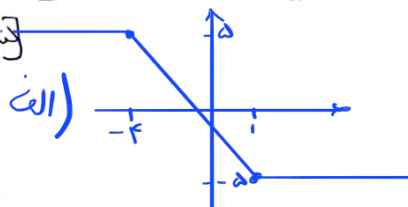
$$\left| \frac{x}{2} + \varepsilon \right| - 1 = \left| \frac{x}{2} \right| - 2 \Rightarrow \left| \frac{x}{2} + \varepsilon \right| = \left| \frac{x}{2} \right| - 1$$

$$\frac{x^2}{\varepsilon} + 1 + \varepsilon x = \frac{x^2}{\varepsilon} + 1 - x \Rightarrow \omega x = -\omega$$

$$\Rightarrow |x| = -3$$

الف) $f(x) = [|x-1| - |x+5|]$

$x = [-\infty, \infty]$



$R_f = \{-5, -1, 1, 5\}$

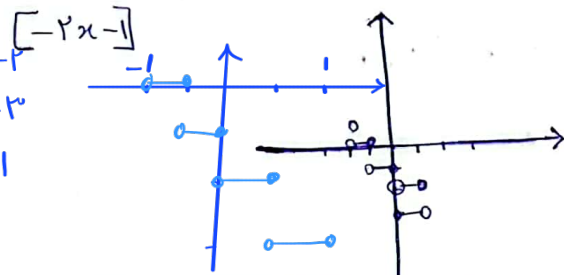
$\Rightarrow f(x) = \frac{1}{x} - \left[\frac{x+1}{x} \right]$

$x = \mathbb{R}$

ب) $f(x) = \frac{1}{x} - \left[\frac{1}{x} \right] - 1 \rightarrow R_f = \{-1\}$

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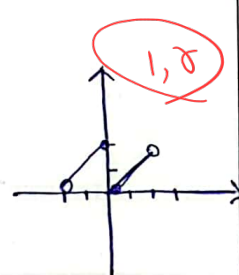
الف) $y = [-2x] - 1 \quad x \in (-1, 1)$



$-1 < x \leq -\frac{1}{2} \rightarrow -1$
 $-\frac{1}{2} < x \leq 0 \rightarrow -2$
 $0 < x \leq \frac{1}{2} \rightarrow -3$
 $\frac{1}{2} < x < 1 \rightarrow -4$

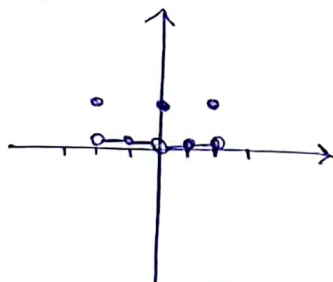
$\Rightarrow y = x - 2 \left[\frac{x}{2} \right] \quad x \in (-2, 2)$

$\begin{cases} -2 < x \leq -1 \Rightarrow x+2 \\ -1 < x \leq 0 \Rightarrow x+1 \\ 0 < x \leq 1 \Rightarrow x \\ 1 < x \leq 2 \Rightarrow x-1 \end{cases}$

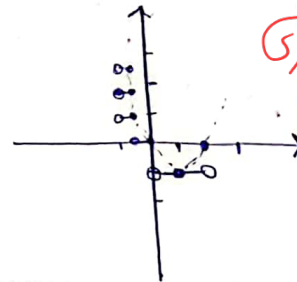


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الف) $y = [|x| - 1]$ $x \in [-2, 2]$



$\Rightarrow y = [x^2 - 2x] \quad x \in [-1, 2]$



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$a + [b] = 5/4$

$b - [a] = 2/5$

$a + b = 5$

$a = 5/4 - [b]$

$b - [5/4 - [b]] = 2/5$

$a + b = 5/4$

$[b] = 3$

$[a] = 1$

$a = 1/4$

$b = 2/5$

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$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 141$

جزء صحيح عدد $(1 + \sqrt{2})^4$

$[141 - (1 - \sqrt{2})^4] \rightarrow 141 + \underbrace{[-(1 - \sqrt{2})^4]}_{-1} = 140$

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