

$$x > 1 \rightarrow \frac{1}{x-1} < x-1 \rightarrow x^2 - 2x < 0 \rightarrow x^2 < 2x \checkmark$$

$$\rightarrow x < 0 \times$$

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$$x < 1 \rightarrow \frac{1}{x-1} < 1-x \rightarrow x^2 - 2x < 1-x \rightarrow \Delta < 0 \rightarrow \text{ریشه ندارد}$$

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$$\text{الف) } |2x-1| < |2x| \rightarrow 4x^2 - 4x + 1 < 4x^2 \quad \frac{1}{4} < x$$

$$\text{ب) } |x-2| > |2x+1| \rightarrow x^2 - 4x + 4 > 4x^2 + 4x + 1$$

$$\rightarrow 3x^2 + 8x - 3 < 0 \rightarrow 3(x+\frac{4}{3})(x-\frac{1}{3}) < 0$$

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

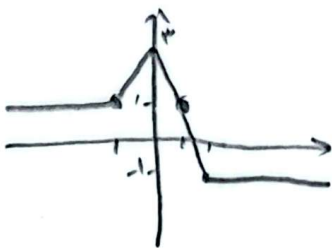
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$$x^2 < |x+6| \xrightarrow{x \geq -6} x^2 - x - 6 < 0 \rightarrow (x-3)(x+2) < 0 \rightarrow -2 < x < 3$$

$$\xrightarrow{x < -6} x^2 + x + 6 \rightarrow \Delta < 0 \rightarrow \text{هواره مثبت}$$

$$(x - \frac{3-2}{2}) < \frac{3+2}{2} \rightarrow (x - \frac{1}{2}) < \frac{5}{2} \rightarrow x < \frac{1}{2} + \frac{5}{2}$$

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$$\left. \begin{array}{l} y_{\max} = 1 \\ y_{\min} = -1 \end{array} \right\} \rightarrow -1 \leq y$$

$$x < -1 \rightarrow 1 \quad -1 < x < 0 \rightarrow 2x+3$$

$$x > 2 \rightarrow -1 \quad 0 < x < 2 \rightarrow -2x+3$$

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

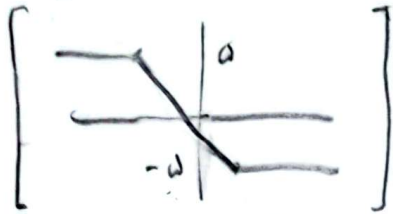
$$|\frac{1}{2}x| - 2 \leq |\frac{1}{2}x + 2| - 1 \rightarrow |\frac{1}{2}x| \leq |\frac{1}{2}x + 2| + 1$$

$$\Rightarrow |x| - 2 \leq |x + 4| \rightarrow x \leq x + 4 \rightarrow 0 \leq 4x \quad x \leq 2$$

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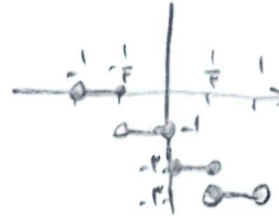
$$-x \leq x + 4 \rightarrow x \geq -3 \checkmark \quad -x \leq -x - 2 \rightarrow 0 \leq -2x$$

$$w) = [1x-1] - [x+1] \rightarrow R \in [-a, a] \rightarrow R_f = \{a, -a, \dots, a\}$$



$$ب) f(x) = \frac{1}{x} - \left\lfloor \frac{x+1}{x} \right\rfloor = \frac{1}{x} - 1 - \left\lfloor \frac{1}{x} \right\rfloor \rightarrow \frac{0 \leq y < 1}{\frac{1}{x} - \left\lfloor \frac{1}{x} \right\rfloor - 1 \rightarrow R_f = [-1, 0]}$$

$$الف) y = \lfloor -x \rfloor - 1 \quad x \in (-1, 1)$$



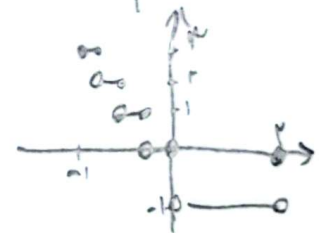
$$ب) y = x - 2 \left\lfloor \frac{x}{2} \right\rfloor \quad x \in [-2, 2]$$



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



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



$$a + [b] \in \mathbb{R}, r \quad a - [a] \in \mathbb{R}, r$$

$$b - [a] \in \mathbb{R}, r \quad b - [b] \in \mathbb{R}, r$$

$$[a] + [b] \in \mathbb{R} \quad [b] - [a] \in \mathbb{R} \rightarrow r[b] \in \mathbb{R} \rightarrow [b] \in \mathbb{R}$$

$$\rightarrow a \in \mathbb{R}, r \text{ and } b \in \mathbb{R}, r \quad a + b \in \mathbb{R}, r \quad [a] \in \mathbb{R}$$

$$(1+\sqrt{2})^2 + (1-\sqrt{2})^2 = 19 \wedge \rightarrow (1+\sqrt{2})^2 \in 19V, \dots$$

$$\sqrt{2} \in \mathbb{R} \rightarrow [(1+\sqrt{2})^2 \in 19V]$$

$$(1-\sqrt{2})^2 \in \mathbb{R} \rightarrow \cdot < (\cdot)^2 < 1$$