

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

$$\rightarrow x < 0 \times$$

یک سیستم

(۲)

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

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

(۱۷۵)

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

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

ریشه خارج $\{-\frac{4}{3}, \frac{1}{3}\}$ $-\frac{4}{3} < x < \frac{1}{3}$

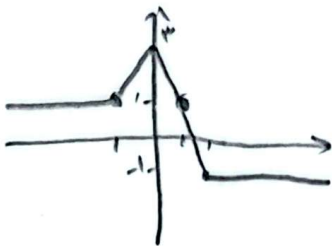
$$x^2 < |x+2| \xrightarrow{x \geq -2} x^2 - x - 2 < 0 \rightarrow (x-2)(x+1) < 0 \rightarrow -1 < x < 2$$

(۲)

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

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



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

(۲)

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

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

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

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

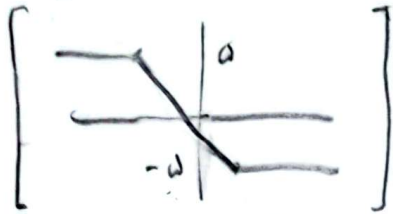
$$\Rightarrow |x| - 2 \leq |x + 4| \rightarrow x \leq x + 4 \rightarrow 0 \leq 4x$$

$$x \leq 2 \checkmark$$

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

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

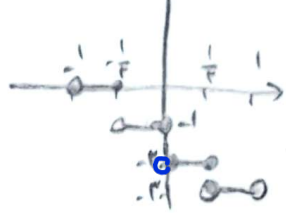


(2)

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

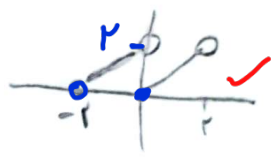
$$الف) y = \lfloor -x \rfloor - 1 \quad x \in (-1, 1)$$



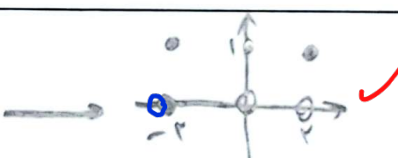
(1, 1/2)

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



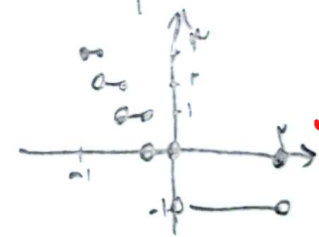
$$g = [|x|-1] \quad x \in [-2, 2]$$



(2)

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



(2)

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$$a + [b] \leq 1, 2 \quad a - [a] \leq 0, 1$$

$$b - [a] \leq 1, 2 \quad b - [b] \leq 0, 1$$

$$[a] + [b] \leq 1 \quad [b] - [a] \leq 2 \rightarrow 2[b] \leq 4 \rightarrow [b] \leq 2$$

$$\rightarrow a \leq 1, 2 \checkmark, b \leq 2, 1 \checkmark \quad a + b \leq 1, 4 \checkmark \quad [a] \leq 1$$

(2)

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

$$\sqrt{2} \leq 1, 4$$

$$\rightarrow [(1 + \sqrt{2})^2] \leq 19 \vee$$

$$(1 - \sqrt{2}) \leq 0, 4 \rightarrow 0 < (1 - \sqrt{2})^2 < 1$$