

$$\frac{1}{x-1} = |x-1| \rightarrow x > 1 \Rightarrow \frac{1}{x-1} = x-1 \rightarrow x^2 - 2x + 1 = 1 \rightarrow x(x-2) = 0 \rightarrow x = 0 \text{ یا } x = 2$$

$$x < 1 \Rightarrow \frac{1}{x-1} = 1-x \rightarrow -x^2 + 2x - 1 = 1 \rightarrow -(x^2 - 2x + 2) = 0 \rightarrow \Delta < 0$$

پس کلاً معادله ریشه حقیقی ندارد. (ایستادار)

$$\frac{x^2 - 4x + 1}{x^2} < 1 \rightarrow x^2 - 4x + 1 < x^2 \rightarrow -4x < 0 \rightarrow x < \frac{1}{4}$$

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

$$x^2 + 4x - 9 < 0 \rightarrow (x-1)(x+9) < 0$$

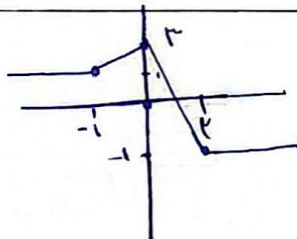
$$x = \frac{1}{2} \rightarrow \frac{-3}{4} < x < \frac{1}{2}$$

$$|x+2| > x^2 \rightarrow \begin{cases} x+2 > x^2 \rightarrow x^2 - x - 2 < 0 \rightarrow (x-2)(x+1) < 0 \rightarrow -1 < x < 2 \\ x+2 < -x^2 \rightarrow x^2 + x + 2 < 0 \rightarrow \Delta < 0 \end{cases}$$

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

$$\Rightarrow x = \frac{1}{2}$$

$$\frac{-1 \quad 0 \quad 2}{+1 \quad |x^2+2| - 2x+3 \quad -1}$$



$$y_{\max} = 2$$

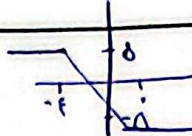
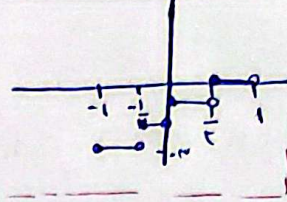
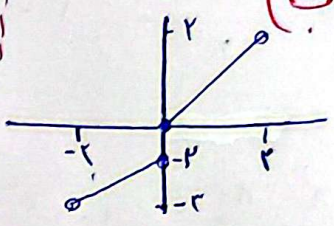
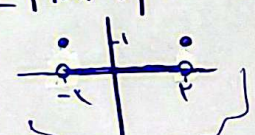
$$y_{\min} = -1$$

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

$$\frac{-4 \quad 0}{3 \leq 0 \quad |1-x| = 3 \quad 2 \leq 1}$$

$$x = -3$$

$$x = -3$$

الف $f(x) = [1-x - x+1] \Rightarrow \underbrace{ 1-x - x+1 }_{+} \rightarrow$  $\Rightarrow R[f] = \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\} \subseteq R = \{x -5 \leq x \leq 5, x \in \mathbb{Z}\}$ $f(x) = \frac{1}{x} - \left\lfloor \frac{x+1}{x} \right\rfloor = \frac{1}{x} - \left\lfloor \frac{1}{x} \right\rfloor - 1 \Rightarrow R_f = \text{---} [-1, 0)$ ب	6
الف $g = [-2x] - 1 \quad x \in (-1, 1)$ $-1 < x < -\frac{1}{2} \rightarrow g = -3$ $-\frac{1}{2} < x < 0 \rightarrow g = -2$ $0 < x < \frac{1}{2} \rightarrow g = -1$ $\frac{1}{2} < x < 1 \rightarrow g = 0$ ب   $g = x - 2\left[\frac{x}{2}\right]$ $-2 < x < 0 \rightarrow g = x - 2$ $0 \leq x < 2 \rightarrow g = x$ ب	7
الف $g = [x - 1] \xrightarrow{x-1} \xrightarrow{ x } \xrightarrow{ x -1} \xrightarrow{[x]} \xrightarrow{[x]}$  ب $g = x^2 - 2x \rightarrow x(x-2) \dots \xrightarrow{[-1, 2]} \xrightarrow{[x]}$  ب	8
$a + [b] = 1/2 \Rightarrow [a] + [b] = 1 \oplus [b] = 1 \Rightarrow [b] = 1$ $b - [a] = 2/3 \Rightarrow [b] - [a] = 2 \Rightarrow [a] = 1$ $P_b = 1/2 \rightarrow b = 1 + 1/2 = 3/2$ $P_a = 1/2 \rightarrow a = 1 + 1/2 = 3/2$ $\} a + b = 3$ ب	9
$(4 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 191 \Rightarrow 191 < (4 + \sqrt{2})^4 < 191 \Rightarrow [(4 + \sqrt{2})^4] = 191$ ب	10