

$$x > 1 \rightarrow \frac{1}{x-1} = x-1 \rightarrow x^2 - 2x = 0 \rightarrow x = 2, 0 \rightarrow \text{نخستین} \quad (1)$$

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

یک ریشه دارد $\rightarrow (1), (2)$

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

$$\frac{x-1}{x} - 2 < 0 \rightarrow -\frac{1}{x} < 0 \rightarrow x \in (0, +\infty) \quad (1)$$

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

$$\hookrightarrow x \in (-\infty, 0) \cup (\frac{1}{2}, +\infty) \quad (2) \quad \{ x \in (-\infty, 0) \cup (0, +\infty) \}$$

$$\text{ب) } \left| \frac{x-2}{2x+1} \right| > 1 \rightarrow \frac{x-2}{2x+1} > 1, \frac{x-2}{2x+1} < -1$$

$$\frac{x-2}{2x+1} - 1 > 0 \rightarrow \frac{-x-3}{2x+1} > 0 \rightarrow \frac{x}{-\frac{3}{2} - \frac{1}{2}} \quad (1)$$

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

$$(1), (2) \rightarrow x \in (-3, -\frac{1}{2}) \cup (-\frac{1}{2}, \frac{1}{3})$$

$$x > -4 \rightarrow x^2 - x - 4 < 0 \rightarrow \frac{x}{\frac{-1}{2} - \frac{1}{2}} \rightarrow x \in (-2, 3) \quad (1)$$

$$x < -4 \rightarrow x^2 + x + 4 < 0 \rightarrow \Delta < 0, a > 0, x \in \emptyset \quad (2)$$

$$(1), (2) \rightarrow x \in (-2, 3), \quad |x-\alpha| < \beta \rightarrow x-\beta < x < x+\beta$$

$$\alpha + \beta = 3, \alpha - \beta = -2 \rightarrow 2\alpha = 1 \rightarrow \alpha = +\frac{1}{2}$$

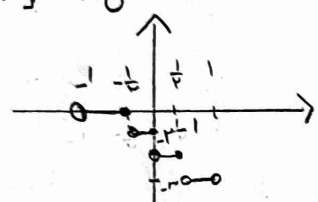
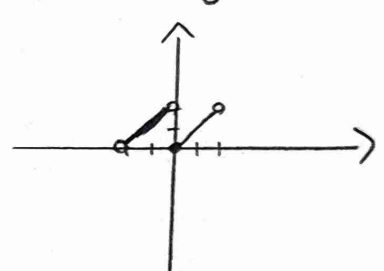
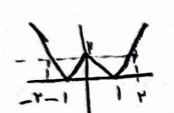
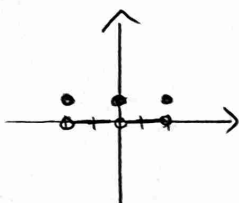
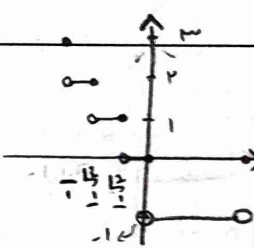
$$\begin{array}{c|c|c|c} -1 & 0 & 2 & \\ \hline 1 & 2x+3 & -2x+3 & -1 \\ \hline & 1 & 3 & -1 \end{array}$$

$$\left. \begin{array}{l} x > 2 \rightarrow y = \{-1\} \\ x < -1 \rightarrow y = \{1\} \\ x > 0 \rightarrow y = [-1, 3] \\ x > -1 \rightarrow y = [1, 3] \end{array} \right\} \begin{array}{l} \text{لستین: } y = -1 \\ \text{بیشترین: } y = 3 \end{array}$$

$$y_{\text{مجموع}} = |\frac{1}{2}x + 2| - 1, \quad y_{\text{تیم}} = |\frac{1}{2}x| - 2$$

$$|\frac{1}{2}x + 2| - 1 = |\frac{1}{2}x| - 2 \rightarrow \begin{array}{c|c|c|c} -2 & 0 & 2 & \\ \hline -3 & -2 & 1 & -2 \end{array}$$

$$\hookrightarrow x = -3$$

الف) $1-x - x+2$ $\begin{array}{c} -x \\ \hline -x-2 \end{array}$ $x \geq -1 \rightarrow y = \{-\infty\}$ $-1 < x < -2 \rightarrow y = [-\infty, \infty]$ $x < -2 \rightarrow y = \{\infty\}$ $f(x) = [1- 1-x - x+2]$ $f(x) = \{-\infty, -1, 0, \dots, \infty\}$	ب) $\frac{1}{x} - \left\lceil \frac{x+1}{x} \right\rceil = \frac{1}{x} - \left\lceil \frac{1}{x} \right\rceil - 1$ $1 > \frac{1}{x} - \left\lceil \frac{1}{x} \right\rceil \geq 0$ $\hookrightarrow 0 > \frac{1}{x} - \left\lceil \frac{1}{x} \right\rceil - 1 \geq -1$ $\hookrightarrow y \in [-1, 0)$	6	
الف) $x \in (0, \frac{1}{2}] \rightarrow y = -2$ $x \in (-1, -\frac{1}{2}]$ $x \in (\frac{1}{2}, 1) \rightarrow y = -3$ $x \in (-\frac{1}{2}, 0] \rightarrow y = -1$ $y = 0$ 	ب) $x \in [0, 2) \rightarrow y = x$ $x \in (-2, 0) \rightarrow y = x + 2$ 	7	
الف) $x-1 - x$  $x \in [-1, 1] - \{0\} \rightarrow y = 0$ $x = 0, 2, -2 \rightarrow y = 1$ $x \in [1, 2) \cup (-2, -1] \rightarrow y = 0$ 	ب) $x-1 - x$  $x \in (-1, 1-\sqrt{2}) \rightarrow y = -2$ $x \in (0, 2) \rightarrow y = -1$ $x \in \{0, 2\} \rightarrow y = 0, x = \{-1\} \rightarrow y = 2$ $x \in [1-\sqrt{2}, 0] \rightarrow y = 0$ $x \in [1-\sqrt{2}, 1+\sqrt{2}] \rightarrow y = 1$ 	8	
$a = x, 2 \rightarrow [a] = x \quad \{ b = y, 4 \rightarrow [b] = y$ $\rightarrow b - [a] = y, 4 - x = 2, 4$ $\rightarrow a + [b] = x, 2 + y = 4, 2$ $\rightarrow a = 1, 2, b = 3, 4 \rightarrow a + b = 4, 4$			9
$\sqrt{2} \approx 1,4 \rightarrow 1 - \sqrt{2} \approx -0,4 \rightarrow (1 - \sqrt{2})^4 < 1$ $\rightarrow (1 + \sqrt{2})^4 = 19,6 \rightarrow \lceil (1 + \sqrt{2})^4 \rceil = 19,6$			10