

$$\frac{1}{x-1} = |x-1| \rightarrow \frac{1}{x-1} = 1-x \quad \left| \frac{1}{x-1} = x-1 \right.$$

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

$$(x-1)^2 = 1 \rightarrow \text{مقدار}$$

$$(x-1)^2 = 1 \rightarrow 0 < 1$$

$$\boxed{x=2}$$

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

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

$$x-1 < 2x \rightarrow \text{حدا بالا}$$

$$x \neq 0 \rightarrow \left(\frac{1}{3}, +\infty \right)$$

$$b) \left| \frac{x-2}{x+1} \right| > 1$$

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

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

$$\Rightarrow \left(-\frac{1}{2}, -1 \right) \cup (-3, -\frac{1}{2})$$

$$x < |x+4| \rightarrow x+4 > x \rightarrow x^2 - x - 4 < 0 \rightarrow (x-5)(x+2)$$

$$+x+4 < -x \rightarrow x^2 + x + 4 < 0 \rightarrow \Delta < 0 \rightarrow \text{مقدار}$$

$$-B < x-a < B$$

$$-B+a < x < B+a \rightarrow -2 < x < 3$$

$$B+a=3$$

$$-B+a=-2$$

$$x \neq 1 \rightarrow x = \frac{1}{2}$$

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

x	y
-1	1
0	1
2	-1

max = 1
min = -1

$$y = \left| \frac{x}{2} \right| - 2 \xrightarrow{\text{مقدار}} \left| \frac{x+2}{2} \right| - 2 \xrightarrow{\text{مقدار}} \left| \frac{x}{2} \right| - 1$$

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

$$x \rightarrow x = x+2 \rightarrow 0 = 2 \text{ (مقدار)}$$

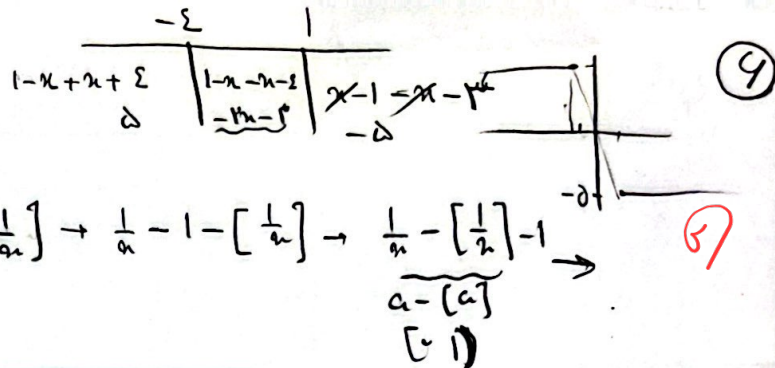
$$x < -2 \rightarrow -x = -x-2-2 \rightarrow 0 = -4 \text{ (مقدار)}$$

$$-2 < x < 0 \rightarrow -x = x+2+2 \rightarrow x = -4$$

$$\boxed{x = -4}$$

$$u) f(x) = [1 - |x| - |x + \varepsilon|]$$

$$R_f = \{-\varepsilon, -\varepsilon, -\varepsilon, -\varepsilon, -1, 0, 1, \varepsilon, \varepsilon, \varepsilon, \varepsilon\}$$



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

$$R_f = [-1, 0]$$

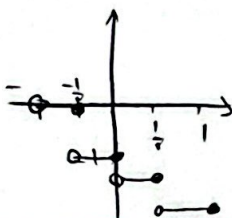
$$y = [-2x] - 1 \quad x \in (-1, 1)$$

$$-1 < x < -\frac{1}{2} \rightarrow y = 0$$

$$-\frac{1}{2} < x < 0 \rightarrow y = -1$$

$$0 < x < \frac{1}{2} \rightarrow y = -2$$

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



$$y = x - 2 \left[\frac{x}{2} \right]$$

$$-1 < x < -\frac{1}{2} \rightarrow y = x + 1$$

$$-\frac{1}{2} < x < 0 \rightarrow y = x$$



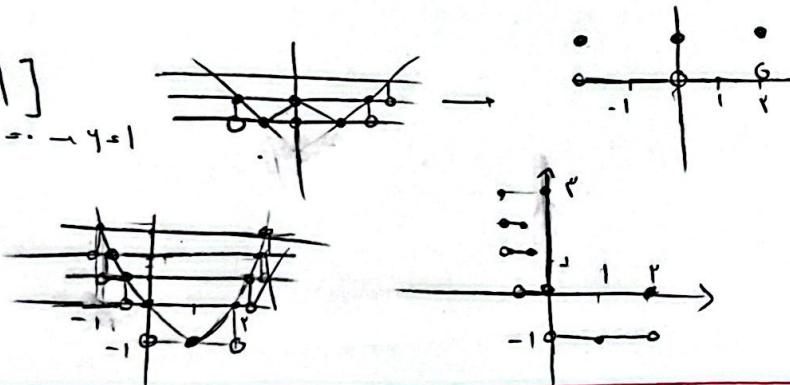
$$u) y = [10x - 11]$$

$$x = -1 \rightarrow y = -1 \quad x = 0 \rightarrow y = -1$$

$$-1 < x < -\frac{1}{2} \rightarrow y = 0$$

$$-\frac{1}{2} < x < 0 \rightarrow y = 1$$

$$b) y = [x^2 - 2x]$$



$$O, r$$

$$a + [b] = 4, 2 \rightarrow 0, 2 + \square = 4, 2 \rightarrow 0 + \square = 4 \quad \left\{ \begin{array}{l} \square = 4 \\ 0 = 1 \end{array} \right.$$

$$b - [a] = 2, 4 \quad \square, 4 + 0 = 2, 4 \quad -0 + \square = 2 \quad \left\{ \begin{array}{l} \square = 2 \\ a = 1, 2 \\ b = 4, 2 \end{array} \right.$$

$$\square, \varepsilon$$

$$[b] = (b - \varepsilon) \quad [a] = (a - \varepsilon)$$

$$a + (b - \varepsilon) = 4, 2 \rightarrow a + b - \varepsilon = 4, 2$$

$$b - (a - \varepsilon) = 2, 4 \rightarrow b - a + \varepsilon = 2, 4$$

$$\left\{ \begin{array}{l} a, b = 2b \rightarrow b \leq 4, 2 \quad a = 1, 2 \end{array} \right\} \quad \left\{ \begin{array}{l} \varepsilon = 1 \end{array} \right.$$

$$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 191$$

$$(1 + \sqrt{2})^4 = 191 - (1 - \sqrt{2})^4$$

$$[(1 + \sqrt{2})^4] = \left[\frac{191}{191} \right] \Rightarrow [(1 + \sqrt{2})^4] = 191$$

(5)