

Axiom 2.1

موضوع

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تکلیف 2.1

$$\frac{1}{n-1} = |x-1|$$

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$$\begin{array}{l} |x| > 1 \\ \frac{1}{n-1} = a-1 \rightarrow (a-1)^2 = 1 \rightarrow n^2 - 2n + 1 = 1 \end{array}$$

$$n^2 - 2n = 0 \rightarrow n(n-2) = 0$$

$$\begin{cases} n = 0 \\ n = 2 \end{cases}$$

$$\begin{array}{l} \frac{1}{n-1} = 1-n \rightarrow (1-n)(n-1) = 1 \\ -n^2 + n - 1 = 1 \end{array}$$

$$-n^2 + n - 2 = 0 \rightarrow n^2 - n + 2 = 0 \rightarrow \Delta < 0$$

موضوع

$$\Rightarrow n = 2$$

$$\text{الف) } \left| \frac{k_{n-1}}{n} \right| < 2$$

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$$-2 < \frac{k_{n-1}}{n} < 2$$

$$\frac{k_{n-1}}{n} - 2 < 0 \rightarrow \frac{k_{n-1} - 2n}{n} < 0 \rightarrow \frac{-1}{n} < 0 \rightarrow n > 0 \quad (1)$$

$$-2 < \frac{k_{n-1}}{n} \rightarrow 0 < \frac{k_{n-1}}{n} + 2 \rightarrow 0 < \frac{k_{n-1} + 2n}{n} \rightarrow 0 < \frac{k_{n-1}}{n} + \frac{2}{1} \quad (2)$$

$$\text{① و ②} \rightarrow \left(\frac{1}{2}, +\infty \right)$$

$$c) \left| \frac{x-r}{k+1} \right| > 1$$

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

$$\begin{array}{c} -r \\ -1 \\ \hline -1 \\ \hline \end{array} \quad \begin{array}{c} -1 \\ -1 \\ \hline -1 \\ \hline \end{array} \quad \begin{array}{c} -r \\ -1 \\ \hline -1 \\ \hline \end{array}$$

① $(-r, -\frac{1}{r})$

$$\frac{-x-r}{k+1} > 0$$

$$\frac{x-r}{k+1} < -1 \rightarrow \frac{x-r}{k+1} + 1 < 0 \rightarrow \frac{x-r+k+1}{k+1} < 0$$

$$\begin{array}{c} -1 \\ -1 \\ \hline -1 \\ \hline \end{array} \quad \begin{array}{c} -1 \\ -1 \\ \hline -1 \\ \hline \end{array} \quad \begin{array}{c} -r \\ -1 \\ \hline -1 \\ \hline \end{array}$$

$$\frac{k-1}{k+1} < 0$$

$$\text{DVP} \Rightarrow (-r, -\frac{1}{r}) \cup (\frac{1}{r}, \frac{1}{r})$$

$$2r < |x+4| \rightarrow |x-a| < \beta$$

(r)

$$x+4 > 2r \rightarrow x-r > -4$$

$$(x-r)(x+4) < 0$$

$$\begin{array}{c} -r \\ -4 \\ \hline -4 \\ \hline \end{array} \quad \begin{array}{c} -4 \\ -4 \\ \hline -4 \\ \hline \end{array} \quad \begin{array}{c} -r \\ -4 \\ \hline -4 \\ \hline \end{array}$$

⑤

$$\rightarrow x+4 < -2r$$

$$x-r < -4$$

$$\Delta < 0$$

$$|x-a| < \beta \rightarrow -\beta < x-a < \beta \xrightarrow{+a} a-\beta < x < a+\beta$$

$$a-\beta = -r$$

$$a+\beta = r$$

$$\frac{a}{k} = 1 \rightarrow a = \frac{1}{r}$$

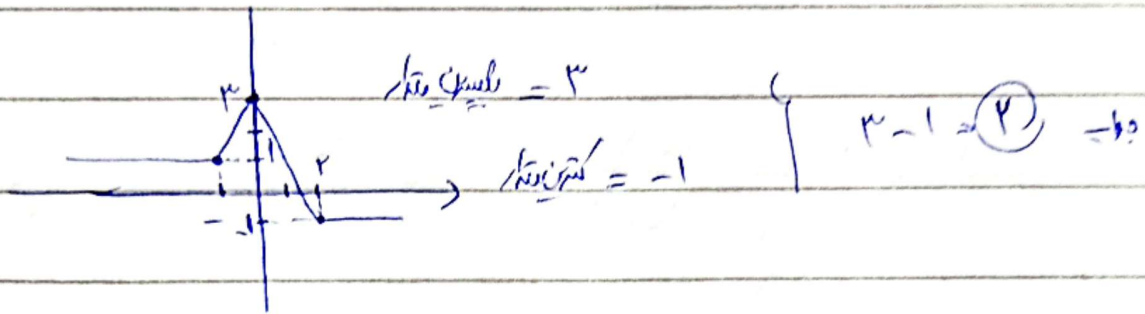


$$y = |x+1| - |x| + |x-2|$$

$$x = -1 \quad x = 0 \quad x = 2$$

(5)

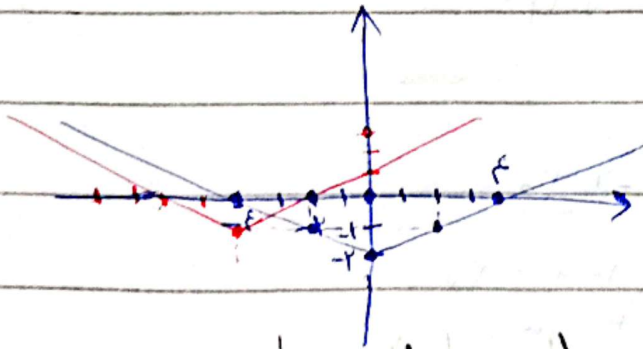
$$-x-1+x-x+2 = \begin{cases} x+1+x-x+2 = 1x+3 & x < -1 \\ x+1-x-x+2 = -x+3 & -1 < x < 0 \\ x+1-x-x+2 = -1 & x > 2 \end{cases}$$



$$y = \left| \frac{1}{r}x \right| - 2$$

$$\begin{matrix} 0 & 2 & 4 & -2 & -4 \\ -2 & -1 & 0 & 1 & 2 \end{matrix}$$

(6)



(5)

$$\frac{1}{r}x + 1 = -\frac{1}{r}x - 2$$

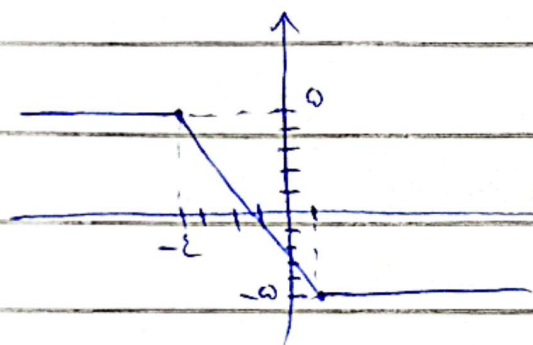
$$x = -\frac{3}{2}$$



$$الف) f(x) = \left[\underset{x=1}{|1-x|} - \underset{x=-\varepsilon}{|x+\varepsilon|} \right] \quad (4)$$

$$\begin{array}{c|c|c} -x & 1 & \\ \hline 1-x+x+\varepsilon = \varepsilon & 1-x-x-\varepsilon = -x-1-\varepsilon & x-1-x-\varepsilon = -1-\varepsilon \end{array}$$

(0) -x-1 (0)



$R_f \Rightarrow$

$$-\varepsilon \leq |1-x| - |x+\varepsilon| \leq \varepsilon$$

$$\left[|1-x| - |x+\varepsilon| \right] = \{-\varepsilon, -\varepsilon+1, -\varepsilon+2, \dots, -1, 0, 1, 2, \dots, \varepsilon\}$$

$$R_f = \{0, \pm 1, \pm 2, \pm 3, \pm 4, \pm 5, \pm 6, \pm 7, \pm 8, \pm 9, \pm 10, \dots\}$$

$$ب) f(x) = \frac{1}{x} - \left\lceil \frac{x+1}{x} \right\rceil = \frac{1}{x} - \underbrace{\left\lceil \frac{1}{x} \right\rceil}_{+} - 1$$

$$0 < x < 1 \rightarrow -1 < \frac{1}{x} - 1 < 0 \rightarrow R_f = (-1, 0)$$

الف) $y = [-2x] - 1, x \in (-1, 1)$

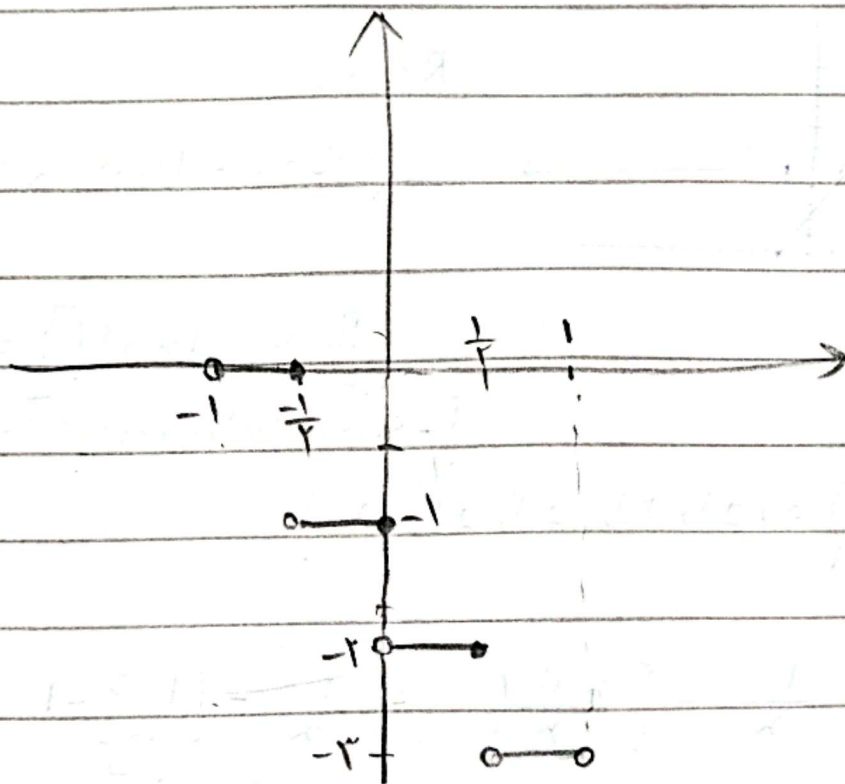
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$-1 < x \leq -\frac{1}{2} \rightarrow y = 0$

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

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

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

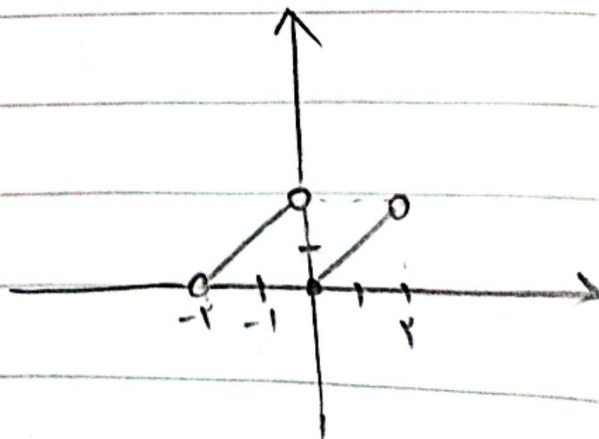


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ب) $y = x - 1 \left[\frac{x}{2} \right], x \in (-2, 2)$

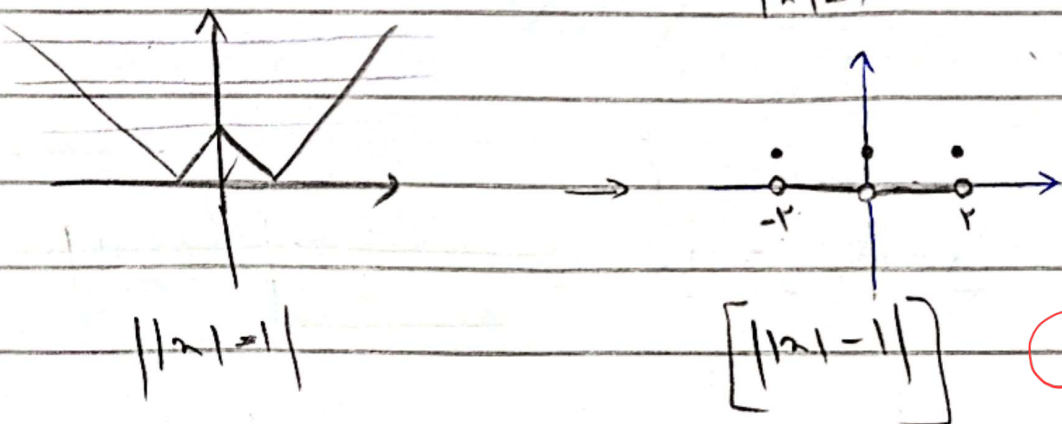
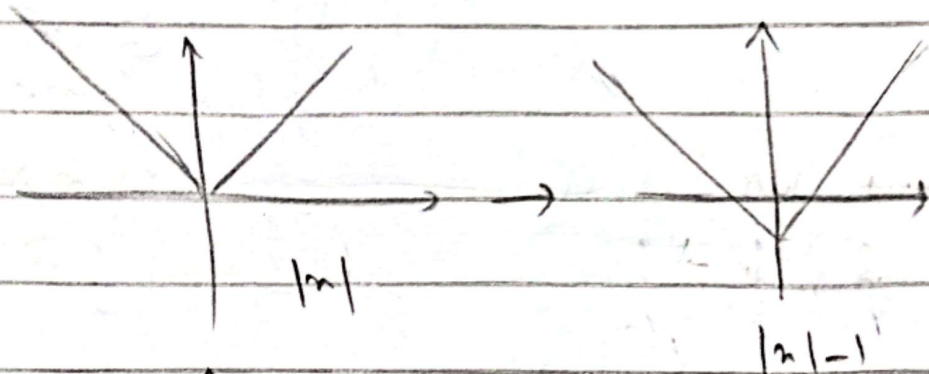
$-2 < x < 0 \rightarrow y = x + 1$

$0 < x < 2 \rightarrow y = x$

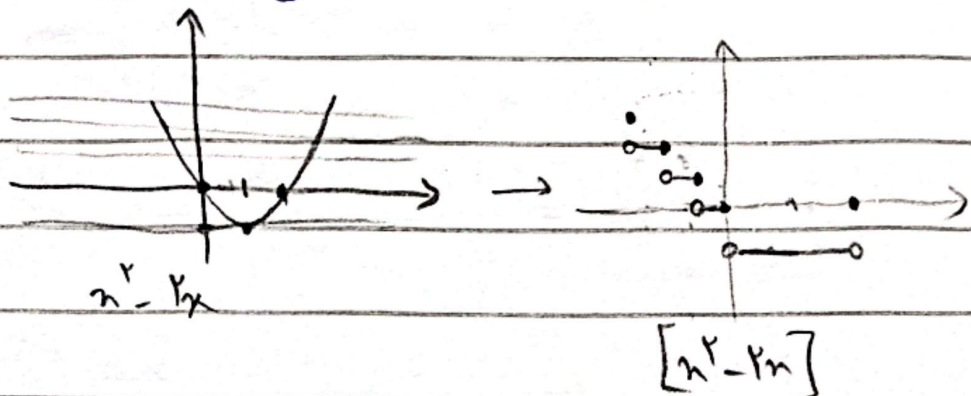




الف) $y = [|x| - 1]$ $x \in [-2, 2]$ (1)



ب) $y = [x^2 - 1]$ $x \in [-1, 2]$



$a + [b] = \varepsilon, \delta$

$b - [a] = \gamma, \varepsilon$

$a + b = ?$

$1/2 + 1/2 = [1] = 1$

(9)

$[a] = x \rightarrow a = x + 0/1$

$\rightarrow a = 1/2$

$[b] = y \rightarrow b = y + 0/1$

$\rightarrow b = 1/2$

$x + 0/1 + y = \varepsilon, \delta$

$\gamma y = 1/4 - 1/4$

$y + 0/1 - x = \gamma, \varepsilon$

$\gamma y = 0$

$y = 1/2, x = 1$

$$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 198 \quad (10)$$

خبر صریح در $(1 + \sqrt{2})^4$ ؟

$$(1 + \sqrt{2})^4 = 198 - \underbrace{(1 - \sqrt{2})^4}_{\approx 0.0001}$$

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

$$(1 + \sqrt{2})^4 \approx 197, \dots$$

$$\lfloor (1 + \sqrt{2})^4 \rfloor = 197$$