

Axiom 1

موضوع

تکلیف ۲.۰

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

1)

$$x > 1 \rightarrow \frac{1}{n-1} = x-1 \rightarrow (x-1)^2 = 1 \rightarrow x^2 - 2x + 1 = 1$$

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

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

$$x < 1 \rightarrow \frac{1}{n-1} = 1-x \rightarrow (1-x)(n-1) = 1$$

$$-x^2 + x - 1 = 1$$

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

هیچ جوابی ندارد

$$\Rightarrow x = 2$$

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

2)

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

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

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

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

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

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

$$\begin{array}{c} -r \\ \hline -\phi + \phi - \\ \textcircled{1} \quad (-r, -\frac{1}{r}) \end{array}$$

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

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

$$\begin{array}{c} 1 \\ \hline -\phi + \phi - \\ \frac{1}{r} \end{array}$$

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

$$\textcircled{1} \cup \textcircled{2} \Rightarrow (-r, -\frac{1}{r}) \cup (\frac{1}{r}, \frac{1}{r})$$

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

(r)

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

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

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

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

$$x-r < -4$$

$$\Delta < 0$$

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

$$a-\beta = -r$$

$$a+\beta = r$$

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



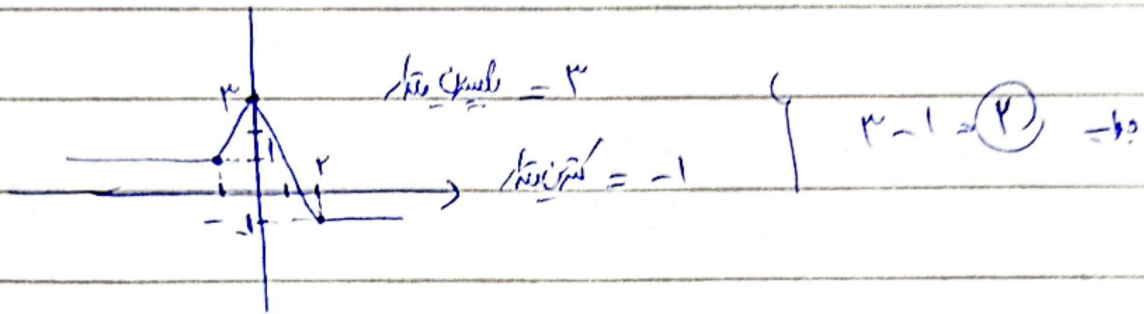
$$y = |x+1| - |x-2| + |x-4| \quad (2)$$

$$x = -1 \quad x = 2 \quad x = 4$$

$$-x-1+x-x+4 = \begin{cases} x+1+x-x+4 \\ x+1-x-x+4 \end{cases} \begin{cases} x+1-x-x+4 \\ x+1-x-x+4 \end{cases} \begin{cases} x+1-x-x+4 \\ x+1-x-x+4 \end{cases}$$

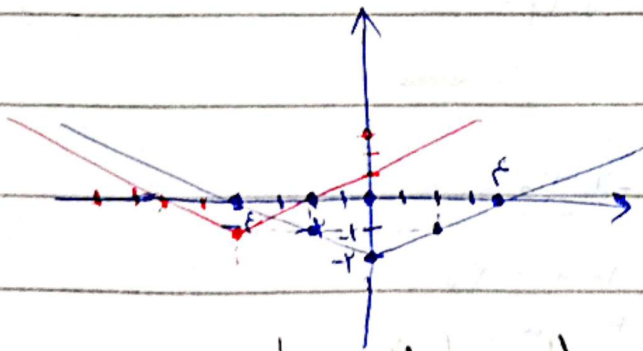
$$= \begin{cases} 1 \\ 1 \end{cases} \begin{cases} 1 \\ 1 \end{cases} \begin{cases} 1 \\ 1 \end{cases}$$

$$\textcircled{1} \quad \textcircled{2} \quad \textcircled{-1}$$



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

$$\begin{matrix} 0 & r & 2 & -r & -r \\ -r & -1 & 0 & -1 & 0 \end{matrix} \quad (3)$$



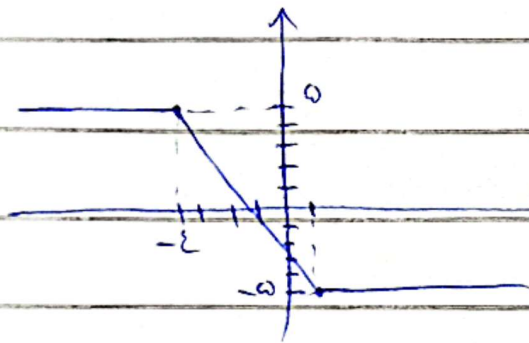
$$\frac{1}{r}x + 1 = -\frac{1}{r}x - r$$

$$x = -r^2$$



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

$$\begin{array}{c|c|c} -x & 1 & \\ \hline 1-x+x+\varepsilon = \varepsilon & 1-x-x-\varepsilon = -x-1-\varepsilon & x-1-x-\varepsilon = -1-\varepsilon \\ \hline \textcircled{1} & -x-1-\varepsilon & \textcircled{2} \end{array}$$



$R_f \Rightarrow$

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

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

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

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

$$0 < t < 1 \rightarrow -1 < t-1 < 0 \rightarrow R_f = (-1, 0)$$

الف) $y = [-2x] - 1, x \in (-1, 1)$

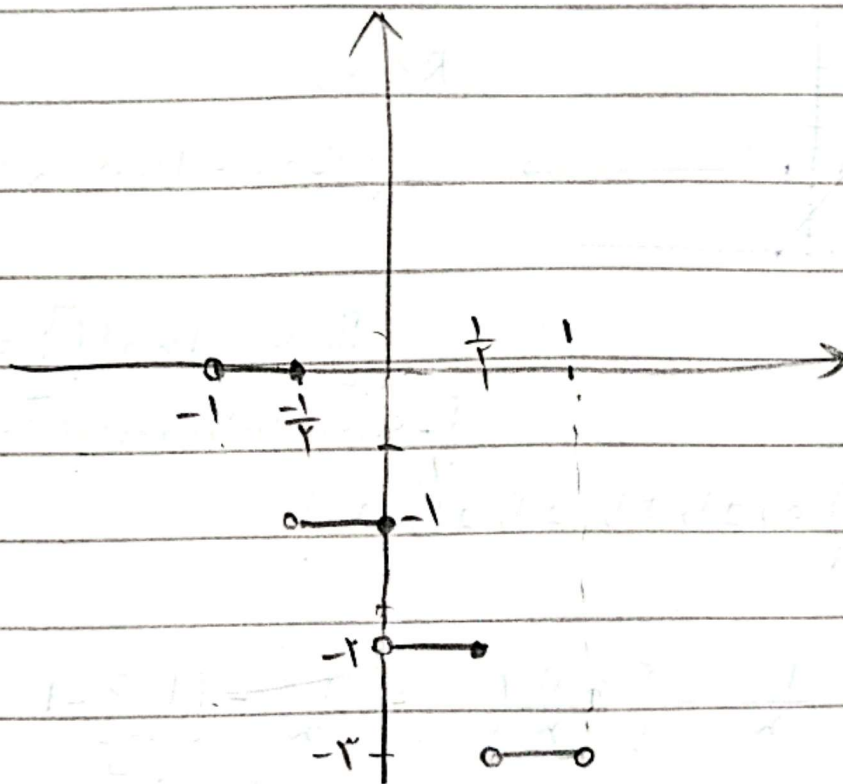
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$-1 < x \leq -\frac{1}{2} \rightarrow y = 0$

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

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

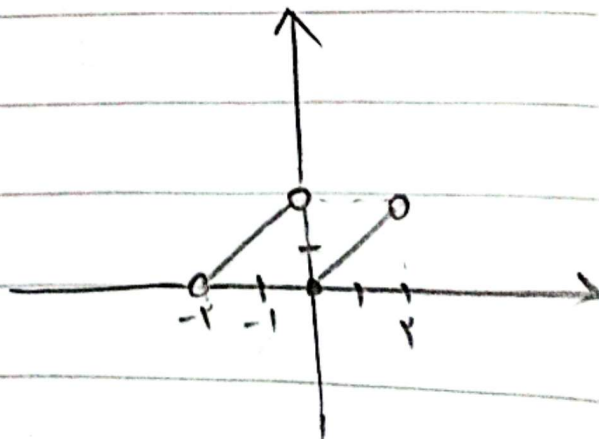
$\frac{1}{2} < x < 1 \rightarrow y = -3$



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

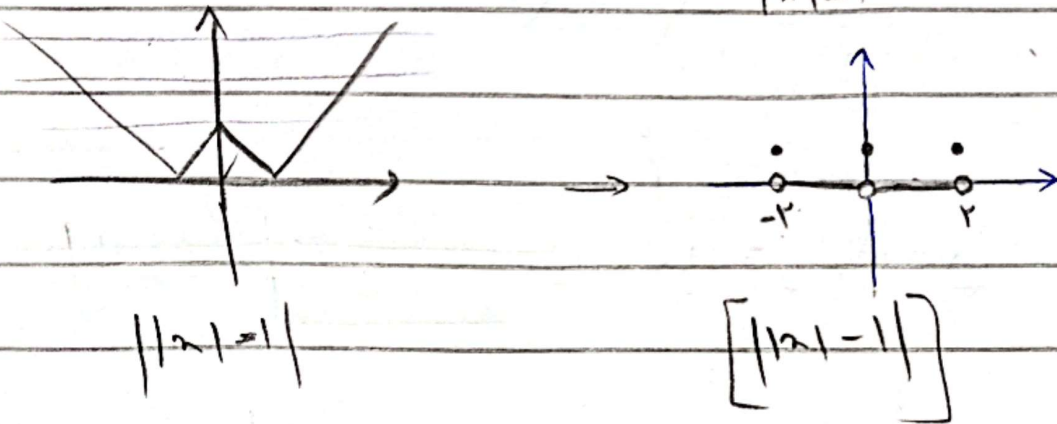
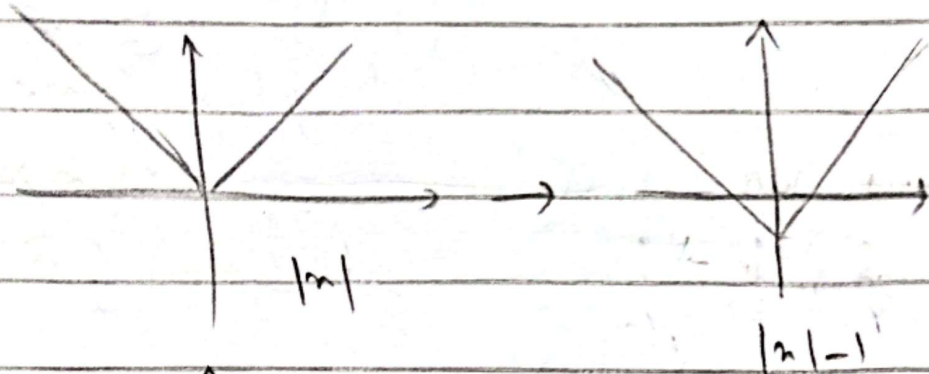
$-2 < x < 0 \rightarrow y = x + 1$

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

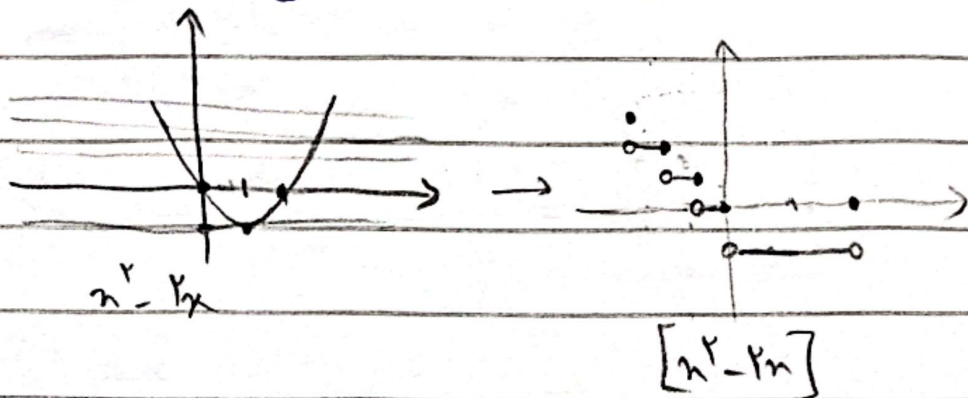




$$الف) y = [|x| - 1] \quad x \in [-2, 2] \quad (1)$$



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



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

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

$$a + b = p$$

$$1/2 + 3/4 = [1/4] \div b$$

(9)

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

$$\rightarrow a = 1/2$$

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

$$\rightarrow b = 3/4$$

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

$$1/2 + 3/4 = 1/4$$

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

$$1/4 = 1/4$$

$$y = 3/4, x = 1$$

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

خبر صریح در $(1 + \sqrt{2})^4$ ؟

$$(1 + \sqrt{2})^4 = 198 - \underbrace{(1 - \sqrt{2})^4}_{\approx 0.06}$$

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

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

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