

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

$$\frac{1}{n-1} = -(n-1) \Rightarrow \frac{1}{n-1} = n-1$$

II B معادله

IV, V, VI

(1)

$$n > 1 \rightarrow \frac{1}{n-1} = n-1 \rightarrow (n-1)^2 = 1 \rightarrow n^2 - 2n + 1 = 1 \rightarrow n^2 - 2n = 0 \rightarrow n(n-2) = 0 \rightarrow n=0 \text{ or } n=2$$

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

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

معادله را حل نمی‌کنیم

$$| \frac{2n-1}{n} | < 2 \rightarrow -2 < \frac{2n-1}{n} < 2 \rightarrow \frac{2n-1}{n} < 2 \rightarrow 2n-1 < 2n \rightarrow -1 < 0 \text{ (True)}$$

$$\textcircled{1} \frac{2n-1}{n} < 2 \rightarrow \frac{2n-1}{n} - 2 < 0 \rightarrow \frac{2n-1-2n}{n} < 0 \rightarrow \frac{-1}{n} < 0 \rightarrow \frac{1}{n} > 0 \rightarrow n > 0$$

$$\textcircled{2} -2 < \frac{2n-1}{n} \rightarrow \frac{2n-1}{n} + 2 > 0 \rightarrow \frac{2n-1+2n}{n} > 0 \rightarrow \frac{4n-1}{n} > 0 \rightarrow 4n-1 > 0 \rightarrow n > \frac{1}{4}$$

$$\rightarrow n=0, n=\frac{1}{4}$$

$$| \frac{n-2}{2n+1} | > 1 \rightarrow \frac{n-2}{2n+1} > 1 \text{ or } \frac{n-2}{2n+1} < -1$$

جواب ندارد

$$\textcircled{1} \frac{n-2}{2n+1} - 1 > 0 \rightarrow \frac{n-2-2n-1}{2n+1} > 0 \rightarrow \frac{-n-3}{2n+1} > 0 \rightarrow \frac{-n-3}{2n+1} > 0$$

$$n = (-3, -\frac{1}{2})$$

$$\textcircled{2} \frac{n-2}{2n+1} + 1 < 0 \rightarrow \frac{n-2+2n+1}{2n+1} < 0 \rightarrow \frac{3n-1}{2n+1} < 0$$

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

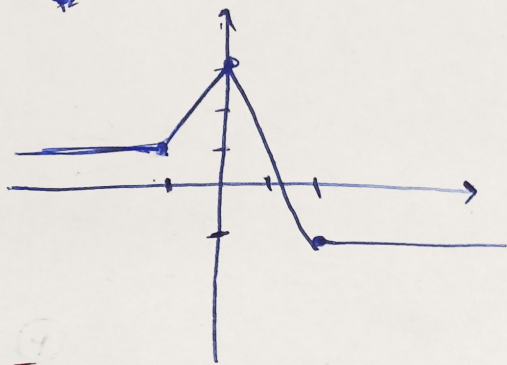
$$(-\frac{1}{3}, \frac{1}{2}) - 1 = -\frac{1}{2}$$

$$\frac{1}{2} + \frac{1}{2} = 1 \rightarrow n = (-\frac{1}{2}, \frac{1}{2})$$

$$|n+4| > n^2 \rightarrow n+4 > n^2 \text{ or } n+4 < -n^2 \rightarrow n^2 - n - 4 < 0 \rightarrow (n-4)(n+1) < 0 \rightarrow n \in (-1, 4)$$

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

$$\begin{array}{cccc}
 -1 & 0 & 1 & 2 \\
 \hline
 -n-1+r & x+1+r & x+1-r & x+1-r \\
 -n+r & r & -r & -r \\
 =1 & r & -r & -1
 \end{array}$$



$$\begin{cases} \max = 2 \\ \min = 1 \end{cases} \Rightarrow \max + \min = 3$$

$$\frac{1}{r} = -r - \left( \frac{1}{r} + r - 1 \right)$$

$$\begin{aligned} \frac{1}{r} n &= -r \\ n &= -r^2 \end{aligned}$$

$$y = \left| \frac{1}{r} n \right| - r \xrightarrow{\text{عوض کردن } r} y' = \left| \frac{1}{r} (x+r) \right| - \frac{1}{r} + 1$$

$$\left| \frac{1}{r} n \right| - 1 = \left| \frac{1}{r} n + r \right| - 1 \Rightarrow \left| \frac{1}{r} n + r \right| - \left| \frac{1}{r} n \right| + 1 = 0$$

$$\begin{array}{ccc}
 -1 & 0 & 1 \\
 \hline
 -\frac{1}{r}x - r + \frac{1}{r}n + 1 & \frac{1}{r}n + r - \frac{1}{r}n + 1 & \frac{1}{r}n + r - \frac{1}{r}n + 1 \\
 -1 = 0 \times & = n + r = 0 & \times r \neq 0 \\
 & \Rightarrow n = -r &
 \end{array}$$

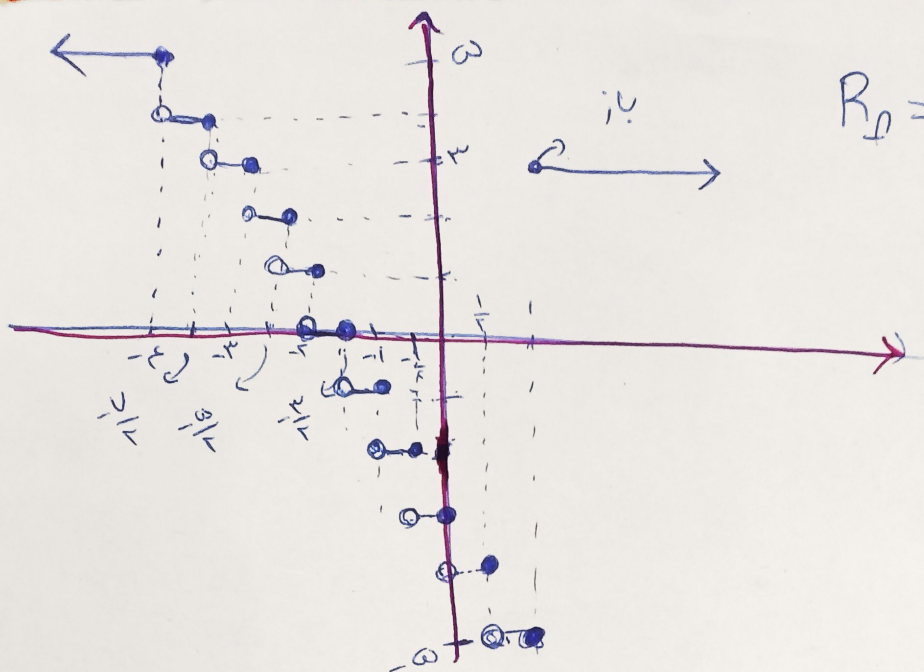
$$f(n) = [ |1-n| - |n+r| ]$$

$$\begin{array}{ccc}
 1-n & 1-n-n-r & x-1-n+r = r \\
 = n+r & = -2n-r & \rightarrow g = [-2n-r] = [-2n] - r \\
 \frac{1}{r} < n < -\frac{1}{r} \rightarrow -\frac{1}{r} < -2n < -\frac{1}{r} \rightarrow \frac{1}{r} < -2n < 1 \rightarrow [-2n] = \frac{1}{r} \rightarrow y = \frac{1}{r} - r = r^2
 \end{array}$$

$$-\frac{1}{r} < n < -r \rightarrow -\frac{1}{r} < -2n < -r \rightarrow r < -2n < \frac{1}{r} \rightarrow [-2n] = r \rightarrow y = r - r = 0$$

بعضی از نقاط را در نظر بگیرید

نمودار کلی را



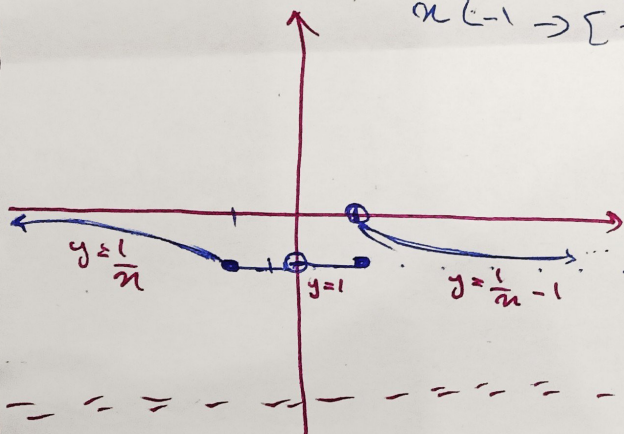
4) nob 1

$$R_D = \{n \in \mathbb{Z} \mid -\omega \leq n \leq \omega\}$$

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ب)  $f(n) = \frac{1}{n} - \left[ \frac{n+1}{n} \right] \Rightarrow \frac{1}{n} - \left[ 1 + \frac{1}{n} \right] \Rightarrow \frac{1}{n} - 1 - \left[ \frac{1}{n} \right]$

$$\frac{1}{n} - \left[ \frac{1}{n} \right] - 1 \begin{cases} \rightarrow n > 1 \rightarrow \left[ \frac{1}{n} \right] = 0, y = \frac{1}{n} - 1 \\ \rightarrow 0 < n \leq 1 \rightarrow \frac{1}{n} = \left[ \frac{1}{n} \right] \Rightarrow y = -1 \\ \rightarrow -1 \leq n < 0 \rightarrow \left[ \frac{1}{n} \right] = \frac{1}{n} \rightarrow y = -1 \\ n < -1 \rightarrow \left[ \frac{1}{n} \right] = -1 \rightarrow y = \frac{1}{n} \end{cases}$$



$$R_D = [-1, 0)$$

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

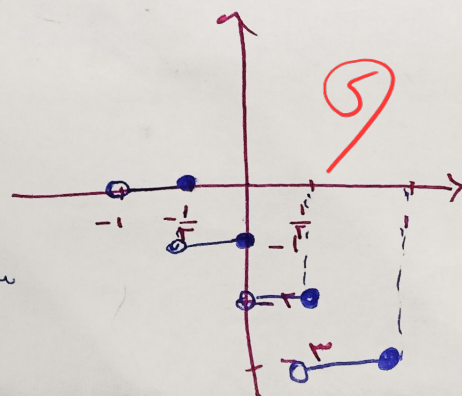
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$$-1 < n \leq -\frac{1}{2} \rightarrow -2 < 2n \leq -1 \rightarrow 1 \leq -2n < 2 \rightarrow [-2n] = 1 \rightarrow y = 1 - 1 = 0$$

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

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

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

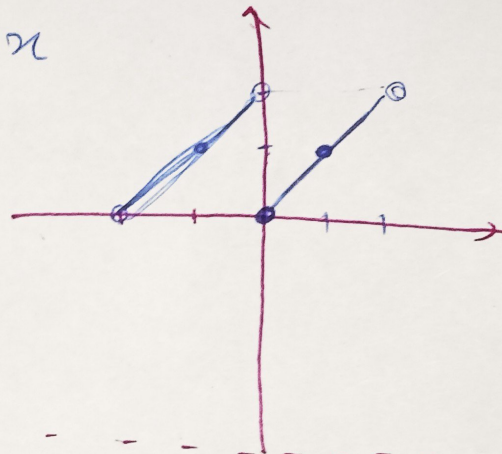


$$\textcircled{b}) x - r \left[ \frac{x}{r} \right] \quad x \in (-r, r)$$

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$$-r < x < 0 \rightarrow -1 < \frac{x}{r} < 0 \rightarrow \left[ \frac{x}{r} \right] = -1 \rightarrow y = x - r(-1) = x + r$$

$$0 \leq x < r \rightarrow 0 \leq \frac{x}{r} < 1 \rightarrow \left[ \frac{x}{r} \right] = 0 \rightarrow y = x$$



$$\left. \begin{array}{l} a + [b] = \varepsilon, r \\ b - [a] = r, \varepsilon \end{array} \right\} \Rightarrow \begin{array}{l} a = x, r \\ b = y, \varepsilon \end{array} \Rightarrow \begin{array}{l} x + b = \varepsilon, y \\ b - a = r, r \end{array}$$

$$r b = y, 1$$

$$b = r, \varepsilon$$

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$$a + b + 0, \varepsilon = \varepsilon, r$$

$$b - (a - 0, r) = r, \varepsilon$$

$$\boxed{a + b = \varepsilon, y}$$

$$a + r, \varepsilon = \varepsilon, y$$

$$a = \varepsilon, y - r, \varepsilon = 1, r$$

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

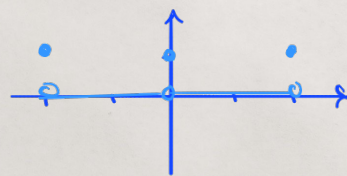
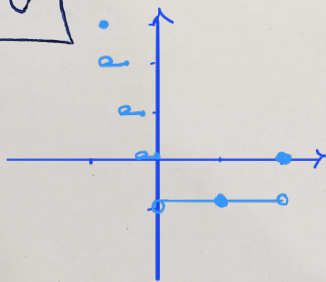
$$\underbrace{(1 - 4\varepsilon)^4}_{(-0, \varepsilon)^4} = 0 < (0, \varepsilon)^4 < 1$$

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$$\Rightarrow (1 + \sqrt{2})^4 = 191 - (0, \varepsilon)^4 \rightarrow 191 < (1 + \sqrt{2})^4 < 191$$

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



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