

$$\frac{1}{n-1} = |n-1| \rightarrow \frac{1}{n-1} = n-1 \Rightarrow (n-1)^2 = 1 \Rightarrow n^2 - 2n = 0 \Rightarrow n=0, n=2$$

نقص

$$\frac{1}{n-1} = 1-n \rightarrow -(n-1)^2 = 1 \Rightarrow n^2 - 2n - 1 = 1 \Rightarrow n^2 - 2n - 2 = 0$$

$$\Delta = 4 - 4(1)(-2) = 12 \rightarrow$$

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$$\left| \frac{r_{n-1}}{n} \right| < 1 \rightarrow \frac{r_{n-1}}{n} < 1 \Rightarrow r_{n-1} < n \Rightarrow -1 < 0 \checkmark$$

$$\frac{r_{n-1}}{n} > -1 \Rightarrow r_{n-1} > -n \Rightarrow r_n > 1 \Rightarrow n > \frac{1}{r}$$

ب

$$\left| \frac{n-r}{r_{n+1}} \right| > 1 \rightarrow \frac{n-r}{r_{n+1}} > 1 \Rightarrow n-r > r_{n+1} \Rightarrow n < -r \text{ I}$$

$$\frac{n-r}{r_{n+1}} < -1 \Rightarrow \frac{n-r}{r_{n+1}} + 1 < 0 \Rightarrow \frac{n-r+r_{n+1}}{r_{n+1}} < 0 \Rightarrow$$

I ∩ II $-\frac{1}{r} < n < -\frac{1}{r}$

$$\frac{r_{n-1}}{r_{n+1}} < 0 \quad -\frac{1}{r} \quad \frac{1}{r}$$

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$$n^2 < |n+4| \rightarrow n^2 < n+4 \Rightarrow n^2 - n - 4 = 0 \rightarrow n = -3 \leq n = 2$$

$$\rightarrow n^2 < -n-4 \rightarrow n^2 + n + 4 = 0 \rightarrow \Delta < 0$$

$$|n-\alpha| < \beta \Rightarrow -\beta < n-\alpha < \beta \xrightarrow{+\alpha} \alpha-\beta < n < \alpha+\beta \Rightarrow \begin{cases} \alpha-\beta = -2 \\ \alpha+\beta = 2 \end{cases} \Rightarrow r_\alpha = 1 \Rightarrow \alpha = \frac{1}{r}$$

$$y = |n+1| - |r_n| + |n-2|$$

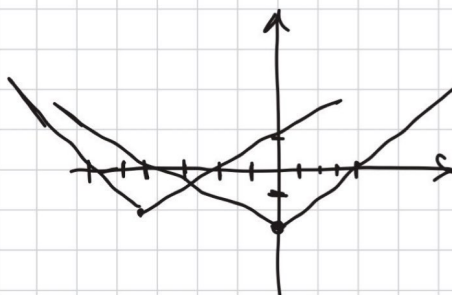
$-1 \leftarrow 0 \leftarrow 2$

$$\begin{array}{cccc} -1 & 0 & 2 \\ | & | & | \\ 1 & r_n+1 & -n+2 & -1 \end{array}$$

$$\min + \max = -1 + 2 = 1$$

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

$$\begin{array}{ccc} 0 \\ -\frac{1}{r}n-2 & | & \frac{1}{r}n-2 \end{array}$$

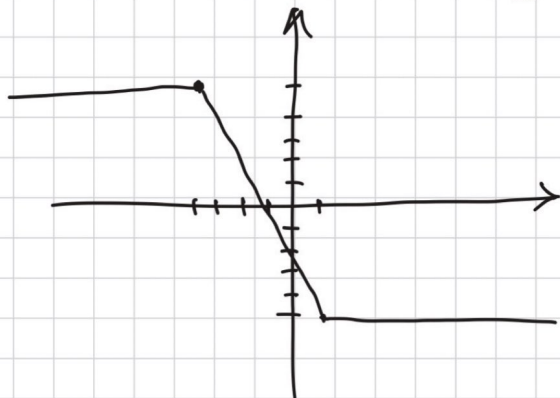


$$\frac{1}{r}n + 1 = -\frac{1}{r}n - 2$$

$$n = -3$$

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

$$\frac{-r}{\Delta} \quad | \quad -\Delta$$



$$-\Delta \leq |r \cdot n| - |n + r| \leq \Delta$$

$$[|r \cdot n| - |n + r|] = \{ -\Delta, -r, \dots, r, \Delta \}$$

$$R_f = \{ \pm \Delta, \pm r, \dots, \pm 1, 0 \}$$

$$\text{ب) } f(n) = \frac{1}{n} - \left[\frac{n+1}{n} \right] = \frac{1}{n} - \left[\frac{1}{n} \right] + 1 \Rightarrow 0 < t < 1 \Rightarrow 1 < t+1 < 2 \Rightarrow R_f = (1, 2)$$

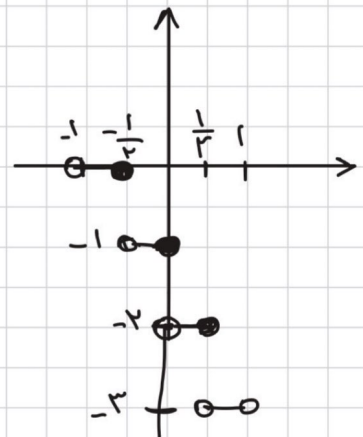
$$\text{الف) } y = [-r_n] - 1$$

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

$$-\frac{1}{r} < n \leq 0 \Rightarrow 0 \leq -r_n < 1 \Rightarrow [-r_n] = 0 \Rightarrow y = -1$$

$$0 < n < \frac{1}{r} \Rightarrow -1 \leq -r_n < 0 \Rightarrow [-r_n] = -1 \Rightarrow y = -r$$

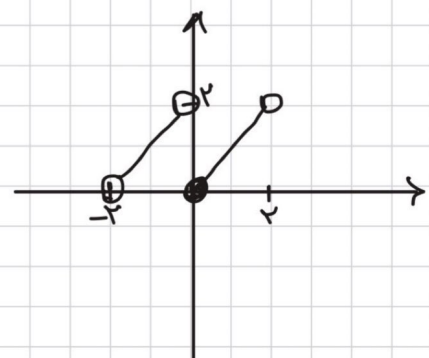
$$\frac{1}{r} < n < 1 \Rightarrow -2 < -r_n < -1 \Rightarrow [-r_n] = -2 \Rightarrow y = -r^2$$



$$\text{ب) } y = n - r \left[\frac{n}{r} \right]$$

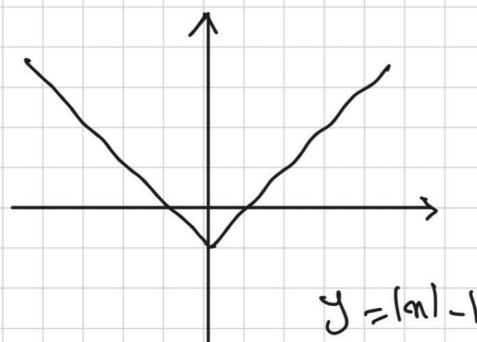
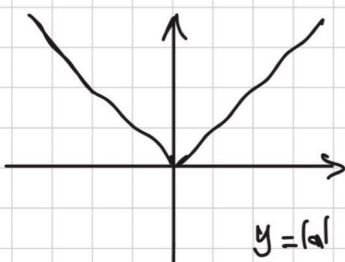
$$-r < n < 0 \Rightarrow -1 < \frac{n}{r} < 0 \Rightarrow \left[\frac{n}{r} \right] = -1 \Rightarrow y = n + r$$

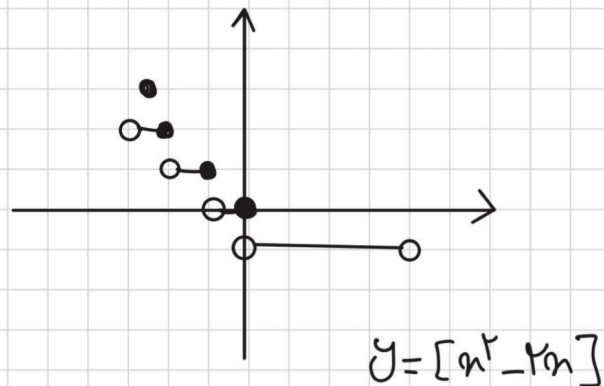
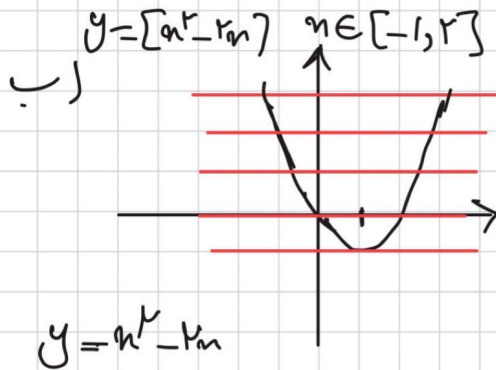
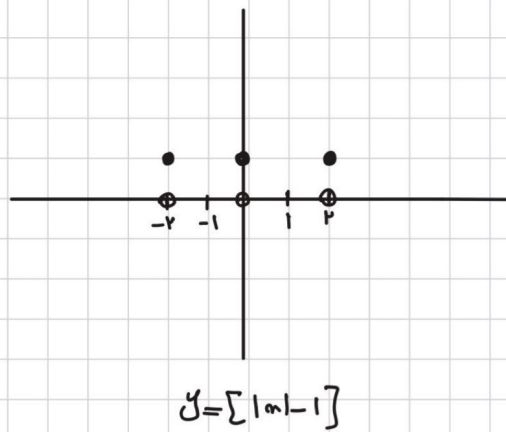
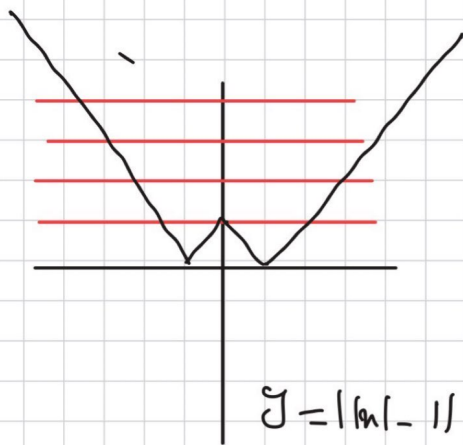
$$0 \leq n < r \Rightarrow 0 \leq \frac{n}{r} < 1 \Rightarrow \left[\frac{n}{r} \right] = 0 \Rightarrow y = n$$



الف)

$$y = [|n| - 1] \quad n \in [-r, r]$$





$$a + [b] = r, r \quad [a] = t \Rightarrow a = t + 0, r$$

$$b - [a] = r, r \quad [b] = s \Rightarrow b = s + 0, r$$

$$t + 0, r + s = r, r \Rightarrow s + t = r$$

$$s + 0, r - t = r, r \Rightarrow s - t = r$$

$$\frac{r}{r} s = r \Rightarrow s = r, t = 1$$

$$b = r, r, a = 1, r \Rightarrow a + b = r, r$$

$$a = (1 + \sqrt{r})^r \quad b = (1 - \sqrt{r})^r \quad \text{تکانه زوج} \quad 1 - \sqrt{r} = -(\sqrt{r} - 1) \Rightarrow -10$$

$$a + b = 191$$

$$b = (1 - \sqrt{r})^r = (\sqrt{r} - 1)^r \rightarrow 0 < \sqrt{r} - 1 < 1 \Rightarrow 0 < b < 1$$

$$a = 191 - b \quad 191 - 1 < a < 191 \Rightarrow 190 < a < 191 \Rightarrow [a] = [(1 + \sqrt{r})^r] =$$

$$\underline{190}$$