

(1)

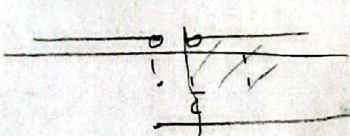
$$\frac{1}{n-1} = |n-1|$$

$$(n-1)^r = 1 \rightarrow n-1 = 1 \rightarrow n=2 \checkmark$$

$$\searrow n-1 = -1 \rightarrow n=0 \times$$

الف) $\left| \frac{r_{n-1}}{n} \right| < r \rightarrow \overbrace{-r < \frac{r_{n-1}}{n} < r}^I \quad I: -r < \frac{r_{n-1}}{n} \rightarrow \cdot < \frac{r_{n-1} + r_n}{n} \rightarrow \cdot < \frac{r_{n-1}}{n}$

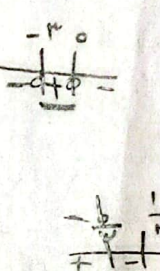
$\overbrace{\left(\frac{1}{2} + \infty \right)}^{II} \quad II: \frac{r_{n-1}}{n} < r \rightarrow \frac{r_{n-1} - r_n}{n} < 0 \rightarrow n > 0$



ب) $\left| \frac{r_{n-1}}{r_{n+1}} \right| > 1 \rightarrow \frac{r_{n-1}}{r_{n+1}} > 1 \rightarrow \frac{r_{n-1} - r_{n+1}}{r_{n+1}} > 0 \rightarrow \frac{-r_n}{r_{n+1}} > 0$

$\frac{r_{n-1}}{r_{n+1}} < -1 \rightarrow \frac{r_{n-1} + r_{n+1}}{r_n} < 0 \rightarrow \frac{r_{n-1}}{r_n} < 0$

$(-r, \frac{1}{r})$

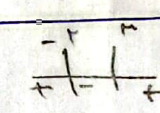


ج) $n^r < |n+y| \rightarrow n+y > n^r \rightarrow n^r - n - y < 0 \rightarrow (n-n^r)(n+y)$

$n+y < -n^r \rightarrow n^r + n + y < 0 \rightarrow \Delta < 0$

$-r < n < r \xrightarrow{-1/\alpha} -r/\alpha < n - 0/\alpha < r/\alpha \rightarrow \left| n - 0/\alpha \right| < \frac{r/\alpha}{1/\alpha} = \frac{r}{1/\alpha}$

$\alpha: \text{میانگین}$



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

$$n = -1 \rightarrow 0 - r + r = 0$$

$$n = 0 \rightarrow 1 - 0 + r = r \rightarrow \text{max}$$

$$n = r \rightarrow r - r = 0 \rightarrow \text{min}$$

سازش

$$y = \left| \frac{1}{r} n \right| - r \rightarrow \left| \frac{n}{r} + \varepsilon \right| - 1$$

$$\left| \frac{n}{r} + \varepsilon \right| - 1 = \left| \frac{n}{r} \right| - r \rightarrow \left| \frac{n}{r} + \varepsilon \right| = \left| \frac{n}{r} \right| - 1$$

$$\frac{n^r}{r} + 1\varepsilon + \varepsilon n = \frac{n^r}{r} + 1 - n$$

$$\omega n = -1\omega \rightarrow n = -1\omega$$

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الف) $f(n) = [1 - u] - [u + \varepsilon]$ $n = \{0 \leq n < \omega, u \in \mathbb{Z}\}$

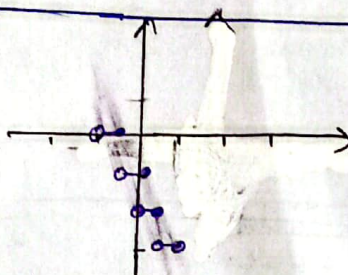
(4)

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

$[-1, 0)$

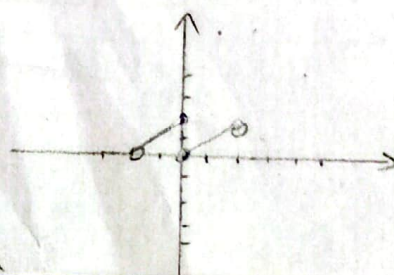
الف) $y = [-rn] - 1$ $u \in (-1, 1)$
 $[-rn-1]$

صندوق مربع: ω

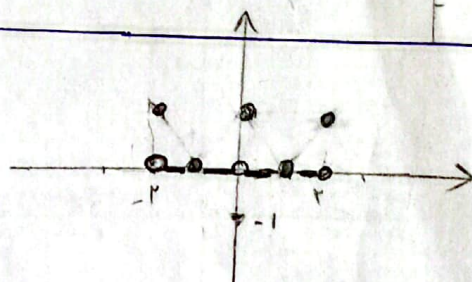


ب) $y = n - r \left[\frac{n}{r} \right]$ $u \in (-r, r)$

$\begin{cases} -r < u \leq -1 : u+r \\ -1 < u \leq 0 : u+r \\ 0 < u \leq 1 : u \\ 1 < u \leq r : u \end{cases}$

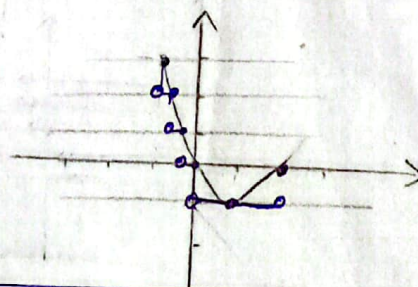


الف) $y = [||u| - 1|]$ $u \in [-r, r]$



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ب) $[u^r - rn]$ $u \in [-1, r]$



$a + [b] = \frac{1}{2}$ $\rightarrow [b] + [a] = \frac{1}{2}$ $\rightarrow [b] = \frac{1}{2}$ $[a] = 1$ $a + b = \frac{1}{2}$
 $b - [a] = \frac{1}{2}$ $[b] - [a] = \frac{1}{2}$ $\rightarrow [b] = \frac{1}{2}$ $\downarrow$ $a = \frac{1}{2}$ $\downarrow$ $b = \frac{1}{2}$

(9)

$(1 + \sqrt{r})^4 + (1 - \sqrt{r})^4 = 19$

$[(\sqrt{r} + 1)^4] = 8$

$[19 - (1 - \sqrt{r})^4] \rightarrow 19 + [- (1 - \sqrt{r})^4] = 19 - 1$

(10)