

$$\frac{1}{n-1} = \frac{|n-1|}{\pm(n-1)} \rightarrow \begin{cases} \frac{1}{n-1} = n-1 \rightarrow n^2 - 2n + 1 = 1 \rightarrow n = 0, 2 \\ \frac{1}{n-1} = -(n-1) \rightarrow -n^2 + 2n - 1 = 1 \xrightarrow{\Delta < 0} \text{غیر حقیقی } n \end{cases}$$

$$\Rightarrow n=0 \rightarrow -1 \neq 1 \quad \times$$

$$n=2 \rightarrow \frac{1}{1} = 1 \quad \checkmark \Rightarrow n=2 \quad \checkmark$$

الف) $-2 < \frac{2n-1}{n} < 2 \rightarrow \begin{cases} \frac{2n-1}{n} - 2 < 0 \rightarrow -\frac{1}{n} < 0 \rightarrow \frac{1}{n} > 0 \rightarrow n > 0 \\ 0 < \frac{2n-1}{n} + 2 \rightarrow \frac{5n-1}{n} > 0 \rightarrow \frac{1}{n} > \frac{1}{5} \end{cases} \Rightarrow n > \frac{1}{5}$

$$\Rightarrow n = \left(\frac{1}{5}, +\infty\right) \quad \checkmark$$

ب) $\left|\frac{n-2}{2n+1}\right| > 0 \rightarrow \begin{cases} \frac{n-2}{2n+1} > 1 \rightarrow \frac{-n-3}{2n+1} > 0 \rightarrow \frac{-1}{2} < \frac{1}{n} < -1 \\ \frac{n-2}{2n+1} < -1 \rightarrow \frac{n-1}{2n+1} < 0 \rightarrow \frac{-1}{2} < \frac{1}{n} < -1 \end{cases} \Rightarrow n = \left(-\frac{1}{2}, -1\right) \cup \left(-1, -\frac{1}{2}\right) \quad \checkmark$

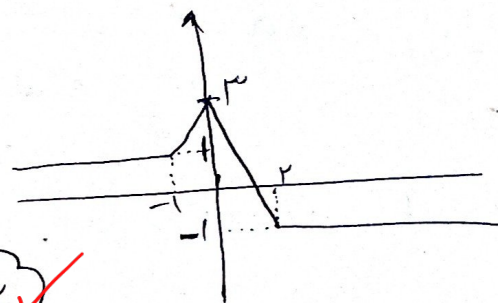
$$n^2 < |n+4| \rightarrow \begin{cases} n^2 < n+4 \rightarrow n^2 - n - 4 < 0 \rightarrow \frac{-1}{2} < \frac{1}{n} < \frac{9}{2} \\ -(n+4) < n^2 \rightarrow n^2 + n + 4 < 0 \rightarrow \Delta < 0, a > 0 \Rightarrow \text{غیر حقیقی } n \end{cases}$$

$$\Rightarrow -\beta < n - \alpha < \beta \rightarrow \begin{cases} -\beta + \alpha = -2 \\ \beta + \alpha = 3 \end{cases} \Rightarrow \alpha = \frac{1}{2}, \beta = \frac{5}{2} \quad \checkmark$$

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

$$\rightarrow \begin{array}{c|ccc} & -1 & 0 & 2 \\ \hline & 1 & 2n+3 & -2n+3 \\ \hline & 1 & 2n+3 & -2n+3 \\ \hline & 1 & 2n+3 & -2n+3 \\ \hline \end{array}$$

$$\Rightarrow \begin{cases} \max = 3 \\ \min = -1 \end{cases} \rightarrow 3 + (-1) = 2 \quad \checkmark$$



$$y = \left|\frac{1}{2}n\right| - 2 \xrightarrow{\text{تبدیل}} y = \left|\frac{1}{2}(n+4)\right| - 2 \xrightarrow{\text{تبدیل}} y = \left|\frac{1}{2}(n+4)\right| - 2 + 1 \Rightarrow y = \left|\frac{1}{2}(n+4)\right| - 1$$

$$\Rightarrow \text{معادله: } \left|\frac{1}{2}n\right| - 2 = \left|\frac{1}{2}n + 2\right| - 1 \rightarrow \left|\frac{1}{2}n\right| - 2 = \left|\frac{1}{2}n\right| + 1$$

$$\Rightarrow \begin{cases} -\frac{1}{2}n - 2 = \frac{1}{2}n + 1 \rightarrow n = -3 \quad \checkmark \rightarrow y = -\frac{1}{2} \\ \frac{1}{2}n - 2 = -\frac{1}{2}n - 1 \rightarrow n = -1 \end{cases} \Rightarrow (-3, -\frac{1}{2})$$

الف) $R(n) = [1 - \alpha - |n + \varepsilon|] \Rightarrow y = (1 - \alpha - |n + \varepsilon|)$  (1, 5)

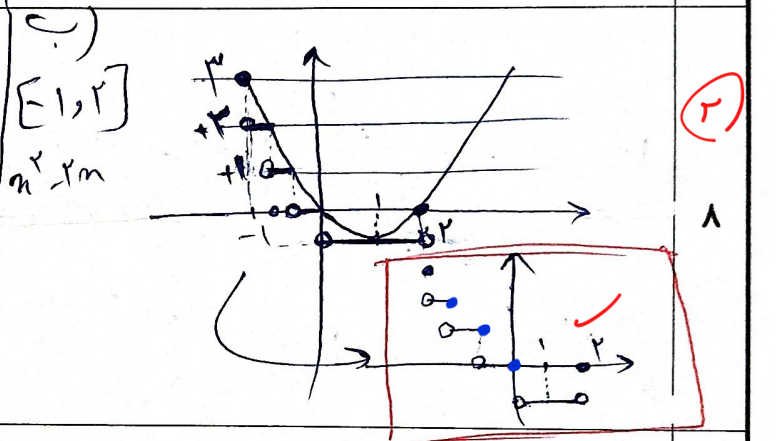
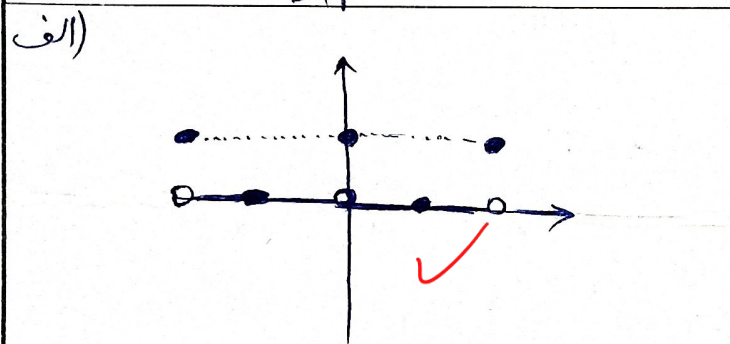
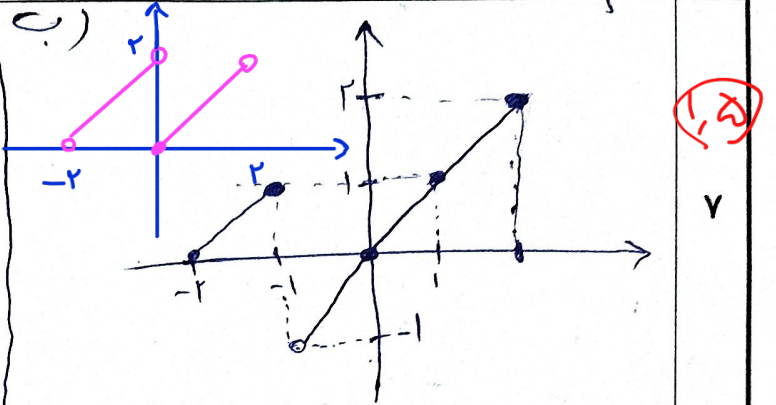
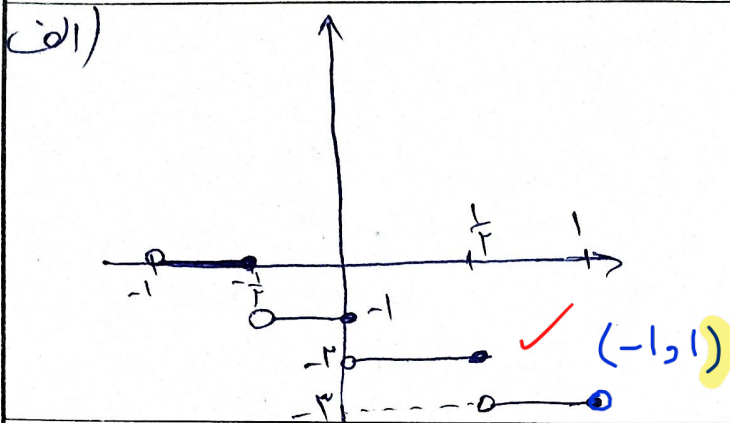
$\Rightarrow [\text{خواب}] = [\mu] = [\underbrace{[-\delta, \delta]}_{\text{نطاق}}] = \{ \pm \delta, \pm \varepsilon, \pm \tau, \pm \tau, \pm 1, 0 \}$ ✓

ب) $[n+1]$

c) $\frac{1}{n} - \left\lceil \frac{n+1}{n} \right\rceil \rightarrow \frac{1}{n} - \left\lceil 1 + \frac{1}{n} \right\rceil = \frac{1}{n} - \left\lceil \frac{1}{n} \right\rceil - 1 \rightarrow \emptyset - \{1\} + 1$

$R = [-1, 0)$





$$\begin{aligned} a + [b] &= \varepsilon, \gamma \rightarrow a = \pi, \gamma \\ b - [a] &= \gamma, \varepsilon \rightarrow b = \pi, \varepsilon \\ \hline a + b + [b] - [a] &= \gamma, \gamma \quad \left. \begin{array}{l} a = [a] + \gamma, \gamma \\ b = [b] + \gamma, \varepsilon \end{array} \right\} \rightarrow a + b = [a] + [b] + \gamma, \gamma \\ \rightarrow [a] + [b] + \gamma, \gamma + [b] - [a] &= \gamma, \gamma \rightarrow [b] = \gamma \rightarrow b = \pi, \gamma \\ \Rightarrow [a] = 1 \rightarrow a = 1, \gamma & \quad a + b = \{ \gamma, \gamma \} \end{aligned}$$

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

$$[(1+\sqrt{r})^4] = [198 - (1-\sqrt{r})^4] = 198 + [- (1-\sqrt{r})^4] = 198 + [0^-] = 198$$

جواب = 198 ✓