

$$\begin{array}{c|c} 1 & 1 \\ \hline \frac{1}{n-1} < -n+1 & \frac{1}{n-1} \geq n-1 \\ -n^2 + 2n - 1 < 0 & n^2 - 2n + 1 \geq 1 \\ \Delta < 0 & n^2 - 2n < 0 \\ x_1 = 0 & n > 0 \\ x_2 = 0 & \boxed{n \geq 2} \end{array}$$

①

الف) $|x_n - 1| < 2n$
 $(x_n - 1)^2 < 4n^2 \rightarrow x_n^2 - 2x_n + 1 < 4n^2$
 $-2x_n + 1 < 4n^2$
 $x_n > \frac{1}{2} \quad n \neq 0$
 $\mathcal{D} \rightarrow (\frac{1}{2}, +\infty)$

ب) $|x_n - 1| > |x_{n+1}| \quad x_{n+1} \neq 0 \rightarrow n \neq -\frac{1}{2}$
 $(x_n - 1)^2 > (x_{n+1})^2$
 $x_n^2 - 2x_n + 1 > x_{n+1}^2$
 $x_n^2 + 2x_n - 3 < 0 \rightarrow x_n = -3$
 $x_n = \frac{1}{2}$
 $\mathcal{D} \rightarrow (-\frac{1}{2}, \frac{1}{2})$

$n+1 > n^2 \rightarrow n^2 - n - 1 < 0 \rightarrow (n-2)(n+1)$
 $n+1 < -n^2 \rightarrow n^2 + n + 1 < 0 \rightarrow \Delta < 0$
 $-2 < n < 2$

$\frac{-2}{2} < n < \frac{2}{2} \rightarrow (-2, 2)$
 $\frac{-\Delta}{2} < n - \frac{1}{2} < \frac{\Delta}{2}$
 $|n - \frac{1}{2}| < \frac{\Delta}{2} \rightarrow d = \frac{1}{2}$

$n < -1 \rightarrow y = -(n+1) + 2n - (n-2) < 1$
 $-1 < n < 0 \rightarrow y = (n+1) + 2n - (n-2) < n+3$
 $0 < n < 1 \rightarrow y = (n+1) - (n-2) = 3$
 $n > 1 \rightarrow y = (n+1) - (n-2) = 3$

$y = |x_n| - 2 \rightarrow y = |\frac{n+1}{2}| - 2 + 1 = |\frac{n+1}{2}| - 1 \rightarrow |\frac{n}{2}| - 2 = |\frac{n+1}{2}| - 1$
 $|\frac{n}{2}| \geq |\frac{n+1}{2}| + 1 \rightarrow |n| \geq |n+1| + 2$
 $n > 0 \rightarrow n \geq n+1+2 \rightarrow 0 \geq 3$
 $n < 0 \rightarrow -n \geq -(n+1)+2 \rightarrow 0 \geq -2$
 $\boxed{n \leq -3}$

الف) $\frac{n}{y} \mid \begin{array}{c} 1 \\ -1 \\ -5 \\ -5 \\ 2 \end{array}$

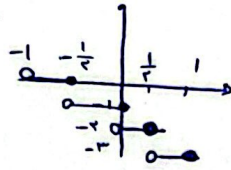
$$|1-n| - |n+1| \rightarrow \frac{-4}{5-2n-1-5}$$

$R_1 = [-5, 5]$
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ب) $\frac{1}{n} - [1 + \frac{1}{n}] \rightarrow \frac{1}{n} - [\frac{1}{n}] - 1$
 $[0, 1)$
 $R_2 = [-1, 0]$

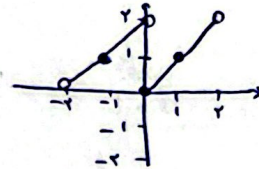
الف) $y \in [-2, 1] - 1 \quad n \in (-1, 1)$

$-1 < n \leq -\frac{1}{2} \rightarrow y = 1 - 1 = 0$
 $-\frac{1}{2} < n \leq 0 \rightarrow y = 0 - 1 = -1$
 $0 < n \leq \frac{1}{2} \rightarrow y = -1 - 1 = -2$
 $\frac{1}{2} < n < 1 \rightarrow y = -2 - 1 = -3$

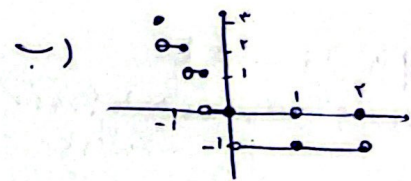
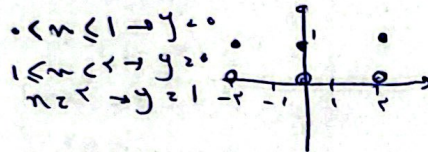


ب) $-2 < n < 0 \rightarrow y = n - 2(-1) = n + 2$

$0 < n < 1 \rightarrow y = n - 2(0) = n$



الف) $n = -2 \rightarrow y = 1$
 $-2 < n \leq -1 \rightarrow y = 0$
 $-1 < n < 0 \rightarrow y = 0$
 $n = 0 \rightarrow y = 1$



$a + (b - 0.14) = 812$
 $b - (a - 0.12) = 41/2$
 $a + b = 1/2 + 812 = 812.5$

$b - [a] = 41/2$
 $[b] + a = 41/2$
 $\rightarrow 2b = 41/2 + 0.12 = 41.12$
 $b = 20.56 \quad a = 41.2$

$(1+\sqrt{2})^9 + (1-\sqrt{2})^9 = 198$
 $(1+\sqrt{2})^9 = 198 - (1-\sqrt{2})^9 \rightarrow -1 < 1-\sqrt{2} < 0 \rightarrow 0 < (1-\sqrt{2})^9 < 1$
 $[(1+\sqrt{2})^9] = [198 - 0.13] = 197$