

سوال ۱

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

$\frac{1}{n-1} = 1-n$ $-n^2 + 2n - 1 = 0$ $\Delta < 0$ ریشه ندارد	$\frac{1}{n-1} = n-1$ $n^2 - 2n = 0$ $n = 0 \rightarrow \text{غذی}$
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فقط یک ریشه دارد $n=2$

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سوال ۲

$$\left| \frac{n-1}{n} \right| < 1 \rightarrow |n-1| < |n| \rightarrow (n-1)^2 < n^2 \rightarrow n^2 - 2n + 1 < n^2 \rightarrow -2n + 1 < 0 \rightarrow n > \frac{1}{2}$$

$$\left| \frac{n-2}{n+1} \right| > 1 \rightarrow |n-2| > |n+1| \rightarrow (n-2)^2 > (n+1)^2 \rightarrow n^2 - 4n + 4 > n^2 + 2n + 1 \rightarrow 0 > 6n - 3 \rightarrow n < \frac{1}{2}$$

$$\begin{array}{c} -3 \\ + \quad - \quad + \end{array} \rightarrow (-3, \frac{1}{2}) \quad \text{①} \quad \begin{array}{l} 2n+1 \neq 0 \\ 2n \neq -1 \\ n \neq -\frac{1}{2} \end{array} \quad \text{②}$$

$$\text{①} \cap \text{②} \rightarrow (-3, -\frac{1}{2}) \cup (-\frac{1}{2}, \frac{1}{2})$$

$$n^2 < |n+4| \rightarrow |n-2| < 3 \quad \alpha = ?$$

سوال ۳

$$\begin{array}{l} n^2 < |n+4| \rightarrow n+4 > n^2 \rightarrow n^2 - n - 4 < 0 \rightarrow n = 3, n = -2 \\ n+4 < n^2 \rightarrow n^2 + n + 4 < 0 \rightarrow \Delta < 0 \end{array} \rightarrow \begin{array}{c} -2 \\ + \quad - \quad + \end{array} \rightarrow (-2, 3)$$

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

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

سوال ۴

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

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

$$0 < n < 2 \rightarrow y = (n+1) - 2n - (n-2) = -2n + 3 \quad n = 2 \rightarrow y = 3 - 4 = -1$$

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

$$\max + \min = 3 - 1 = 2$$

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

سوال ۵

$$\left| \frac{n}{n} \right| - 2 = \left| \frac{n+2}{n} \right| - 1 \rightarrow \left| \frac{n}{n} \right| = \left| \frac{n+2}{n} \right| + 1 \rightarrow |n| = |n+2| + 1$$

$$n > 0 \rightarrow n = n+2+1 \rightarrow 0 = 3 \quad \alpha$$

طول مثلث متساوی الساقین

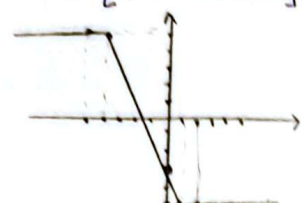
$$-2 < n < 0 \rightarrow -n = n+2+1 \rightarrow n = -3$$

$$n < -2 \rightarrow -n = -n-2+1 \rightarrow 0 = -2 \quad \alpha$$

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مثال ٥) $f(x) = [1 - x - |x+1|] \rightarrow \begin{cases} -x & |x| \leq 1 \\ -x-2 & |x| > 1 \end{cases}$

$R = \{-\infty, -4, -2, -1, 0, 1, 2, 3, \infty\}$



ب) $f(x) = \frac{1}{x} - [\frac{x+1}{x}]$, $\frac{1}{x} - 1 - [\frac{1}{x}] \rightarrow a - [\underbrace{a}_{[0,1)}] - 1 \Rightarrow R = [-1, 0)$

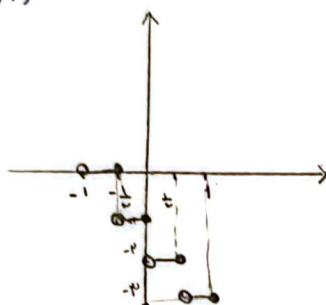
مثال ٦) $y = [-2x] - 1$, $x \in (-1, 1)$

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

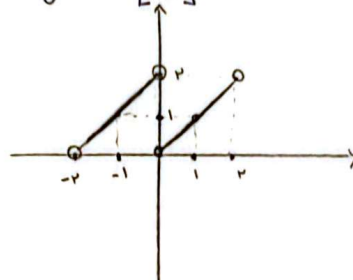
$-\frac{1}{2} < x < 0 \rightarrow y = 0 - 1 = -1$

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

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



ب) $y = x - 2[\frac{x}{2}]$, $x \in (-2, 2)$

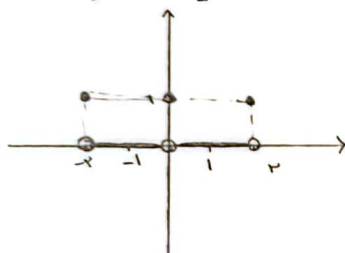


$-2 \leq x < 0 \rightarrow y = x - 2(-1) = x + 2$

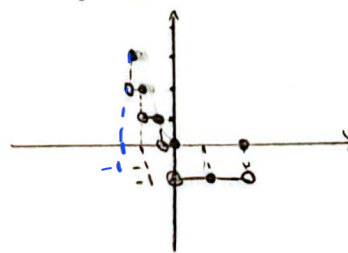
$= x + 2$

$0 \leq x < 2 \rightarrow y = x - 2(0) = x$

مثال ٧) $y = [1|x| - 1]$, $x \in [-2, 2]$



ب) $y = [x^2 - 2x]$, $x \in [-1, 2]$



$a + [b] = 4, 2$, $b - [a] = 2, 4$, $a + b = ?$

$a + (b - 0, 4) = 4, 2$

$\Rightarrow 2b = 4, 4 + 0, 4 = 4, 8 \rightarrow b = 2, 4 \rightarrow a = 1, 2$

$b - (a - 0, 2) = 2, 4$

$\rightarrow a + b = 1, 2 + 2, 4 = 3, 4$

$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 198$, $[(1 + \sqrt{2})^4] = ?$

$(1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 198 \rightarrow (1 + \sqrt{2})^4 = 198 - (1 - \sqrt{2})^4$

$-1 < 1 - \sqrt{2} < 0 \Rightarrow 0 < (1 - \sqrt{2})^4 < 1 \rightarrow [(1 + \sqrt{2})^4] = [198 - 0, \dots] = 197$