

$$\frac{1}{n-1} = |n-1| \xrightarrow{n>1} \frac{1}{n-1} = n-1 \rightarrow n^2 - 2n + 1 = 1 \rightarrow \textcircled{1}$$

$$n^2 - 2n \leq 0 \rightarrow n = 0 \text{ یا } n = 2 \checkmark, \quad \xrightarrow{n<1} \frac{1}{n-1} = 1-n \rightarrow \textcircled{2}$$

$$-n^2 + 2n - 1 \leq 1 \rightarrow n^2 - 2n + 2 = 0 \rightarrow \Delta = b^2 - 4ac < 0 \Rightarrow \text{هیچ جوابی ندارد}$$

$$\text{الف) } \left| \frac{p_{m-1}}{n} \right| < r \rightarrow -r < \frac{p_{m-1}}{n} < r \xrightarrow{\textcircled{1}} \frac{p_{m-1} - p_m}{n} < 0 \rightarrow \textcircled{2}$$

$$-n < 0 \rightarrow n > 0, \quad \textcircled{1} \quad \frac{p_{m-1} + p_m}{n} > 0 \rightarrow \frac{0}{+} \quad \frac{+}{-} \quad \frac{+}{+} \quad \textcircled{1 \text{ و } 2} \rightarrow n \in \left(\frac{1}{r}, +\infty \right)$$

$$\text{ب) } \left| \frac{n-r}{p_{m+1}} \right| > 1 \xrightarrow{\textcircled{1}} \frac{n-r}{p_{m+1}} > 1 \rightarrow \frac{n-r-p_{m+1}}{p_{m+1}} > 0 \rightarrow \frac{-r}{-} \quad \frac{+}{+} \quad \frac{-}{-} \rightarrow \textcircled{2}$$

$$\xrightarrow{\textcircled{1}} \frac{n-r}{p_{m+1}} < -1 \rightarrow \frac{n-r+p_{m+1}}{p_{m+1}} < 0 \rightarrow \frac{-r}{-} \quad \frac{+}{+} \quad \frac{+}{-} \rightarrow \textcircled{2}$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow n \in \left(-r, -\frac{1}{r} \right)$$

$$n^2 < |m+4| \rightarrow n^2 < m+4 \xrightarrow{\textcircled{1}} n^2 - m - 4 < 0 \rightarrow \textcircled{2}$$

$$\frac{-r}{+} \quad \frac{r}{-} \quad \frac{+}{+} \quad \frac{-}{-} \quad \textcircled{1} \quad n^2 + m + 4 > 0 \rightarrow b^2 - 4ac = \Delta \rightarrow \Delta < 0$$

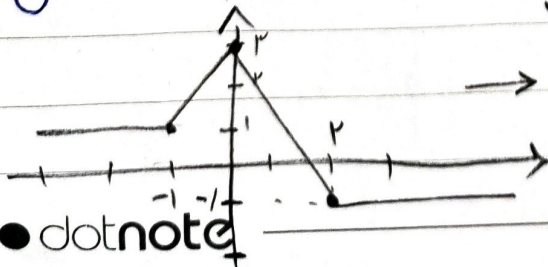
$$\rightarrow -m^2 < n+4$$

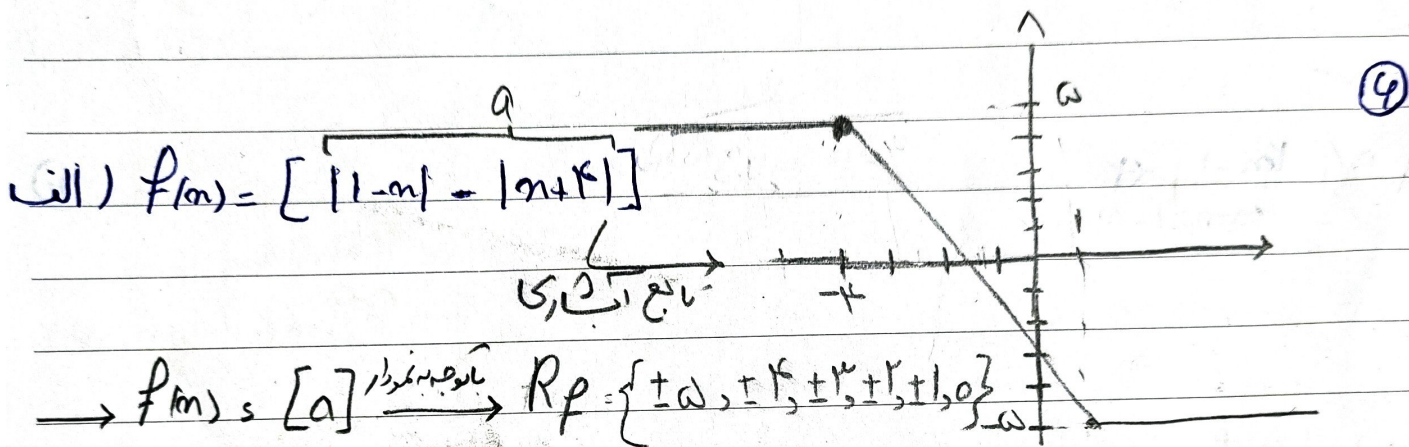
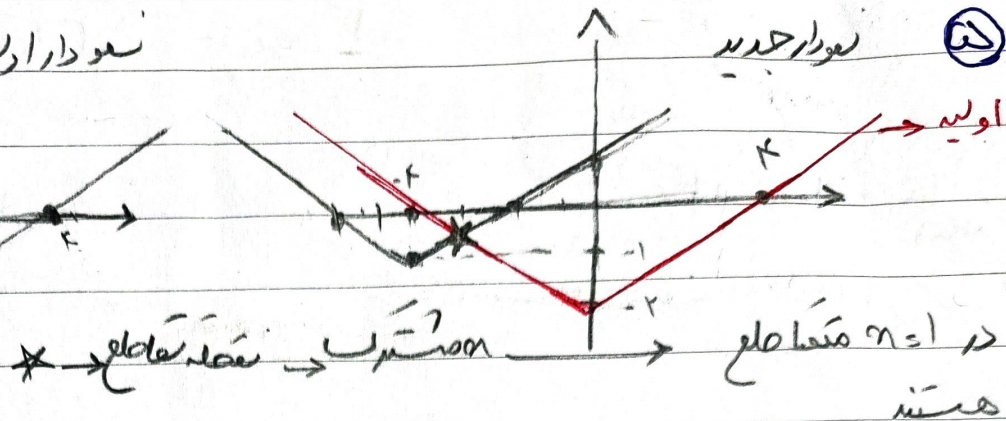
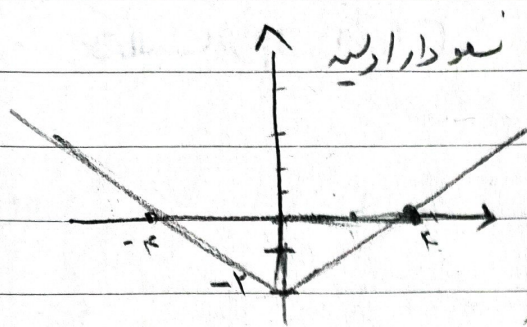
$$|n-\alpha| < \beta \rightarrow -\beta < n-\alpha < \beta \rightarrow \alpha-\beta < n < \beta+\alpha \rightarrow -kn < r$$

$$\begin{cases} \alpha+\beta = r \\ \alpha-\beta = -r \end{cases} \rightarrow r\alpha \leq 1 \rightarrow \alpha \leq \frac{1}{r}$$

$$y = |n+1| - |p_m| + |n-r| \xrightarrow{-1 \quad 0 \quad r} \begin{matrix} -n-1+p_m-r & n+1+p_m- & n+1-p_m-n+r & n+1-p_m+m-p=-1 \\ r=1 & m+r=p_{m+1} & -p_{m+1} & \end{matrix} \textcircled{3}$$

$$\rightarrow \text{many + miny} = -1 + r = r$$





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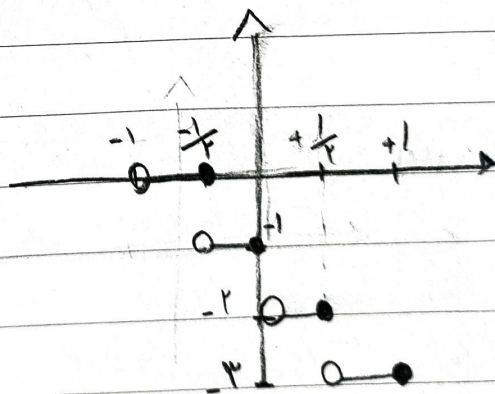
$$y = [-m] - 1, \quad m \in (-1, 1)$$

$$-1 < m \leq -\frac{1}{2} \rightarrow y \leq 0$$

$$-\frac{1}{2} < m \leq 0 \rightarrow y \leq -1$$

$$0 < m \leq \frac{1}{2} \rightarrow y \leq -2$$

$$\frac{1}{2} < m < 1 \rightarrow y \leq -3$$

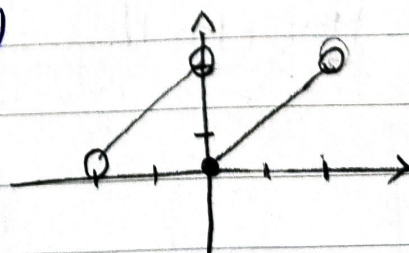


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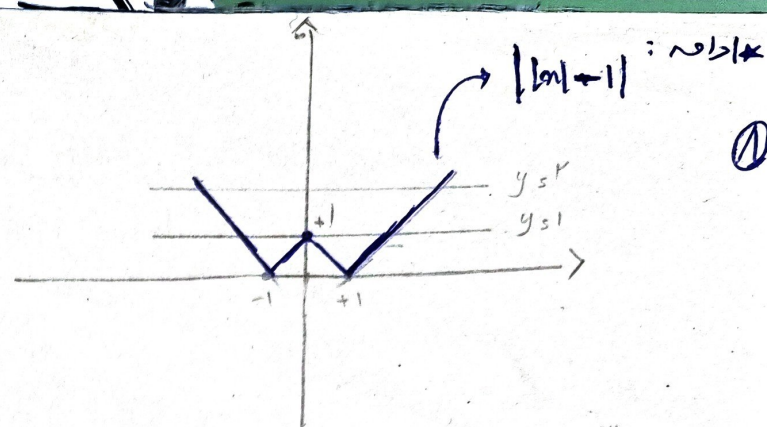
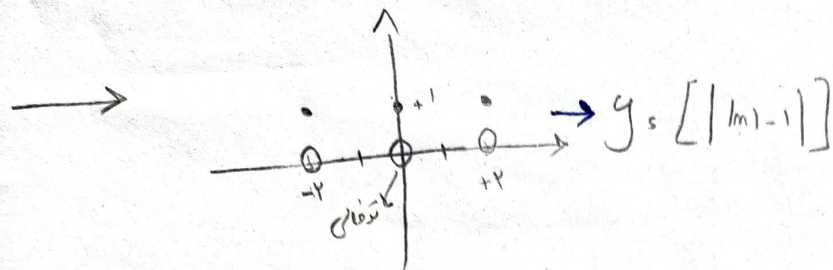
$$y = m - 2 \left[\frac{m}{2} \right], \quad m \in (2, 2)$$

$$-2 < m < 0 \rightarrow y \leq m + 2$$

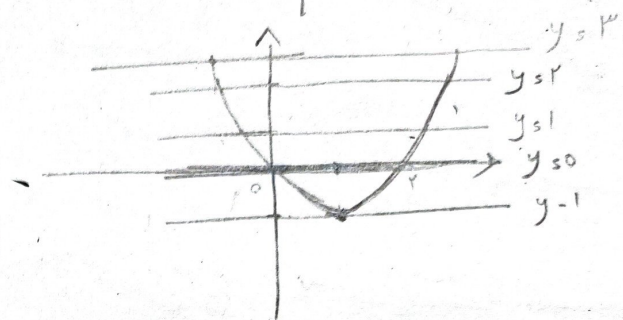
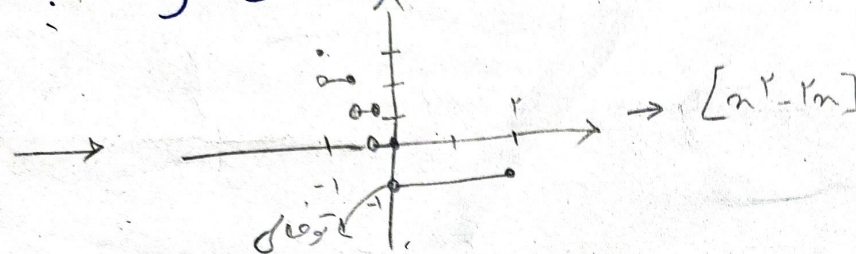
$$0 \leq m < 2 \rightarrow y \leq m$$



الف) $y \in [|m| - 1]$, $m \in [-2, 2]$



ب) $y \in [m^2 - 2m]$, $m \in [-1, 2]$



$a + [b] \in (-1, 2) \rightarrow [a] = m \rightarrow a \in m + (-1, 2) \rightarrow m + (-1, 2) + y = (-1, 2) \rightarrow m + y \in (-1, 2)$
 $b - [a] \in (-1, 2) \rightarrow [b] = y \rightarrow b \in y + (-1, 2) \rightarrow m + y + (-1, 2) = (-1, 2) \rightarrow y - m = 2$
 $2y \in (-1, 2) \rightarrow y \in (-1/2, 1)$, $m = 1 \rightarrow b \in (-1/2, 1)$, $a \in (-1, 2) \rightarrow a + b \in (-1/2, 3)$

$1 - \sqrt{2} < 0 \rightarrow (1 - \sqrt{2})^4 > 0$

$(1 + \sqrt{2})^4 = 19\sqrt{2} - (1 - \sqrt{2})^4 \rightarrow -1 < 1 - \sqrt{2} < 0 \rightarrow -1 < (1 - \sqrt{2})^4 < 0$

$19\sqrt{2} - 1 < (1 + \sqrt{2})^4 < 19\sqrt{2} - 0 \rightarrow 19\sqrt{2} < (1 + \sqrt{2})^4 < 19\sqrt{2} \rightarrow [(1 + \sqrt{2})^4] \in 19\sqrt{2}$