

الف) $|n| = \frac{2y+1}{y-1} \Rightarrow \frac{2y+1}{y-1} \gg 0 \Rightarrow \frac{-\frac{1}{2}}{+} \frac{1}{-} \frac{1}{+} \Rightarrow R_f = \mathbb{R} - (-\frac{1}{2}, 1]$

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ب) $y = |n| + \frac{1}{|n|} \Rightarrow R_f = [2, +\infty)$

$yn + 2y = n^2 + 2n - 2 \Rightarrow n + (2-y)n - 2 - 2y = 0 \Rightarrow n = \frac{y-2 \pm \sqrt{(y-2)^2 - 4(-2y)}}{2}$
 $\Rightarrow y^2 - 4y + 4 + 8 + 4y \geq 0 \Rightarrow y^2 + 12 \geq 0 \Rightarrow \frac{-6}{+} \frac{-2}{-} \frac{2}{+} \Rightarrow R_f = \mathbb{R} - (-6, 2]$

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④ زیرا $\Delta < 0$ است برآیند
 دانه $\rightarrow$ $\mathbb{R}$

⑤ برد $\rightarrow f(n) = \frac{n^2 - n + 1 - \frac{3}{2}}{n^2 - n + 1} \Rightarrow f(n) = 1 - \frac{\frac{3}{2}}{n^2 - n + 1} = 1 - \frac{3}{\varepsilon n^2 - \varepsilon n + \varepsilon}$
 $\Rightarrow \frac{3}{\varepsilon n^2 - \varepsilon n + \varepsilon} \leq \frac{1}{\varepsilon n^2 - \varepsilon n + \varepsilon} \leq \frac{1}{\varepsilon} \Rightarrow \frac{3}{\varepsilon n^2 - \varepsilon n + \varepsilon} \leq 1 \Rightarrow \frac{3}{\varepsilon n^2 - \varepsilon n + \varepsilon} \geq -1$
 $\Rightarrow 0 \leq 1 - \frac{3}{\varepsilon n^2 - \varepsilon n + \varepsilon} < 1 \Rightarrow R_f = [0, 1)$

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الف) داخل رادیکال: $-n^2 + \varepsilon n - 1 \leq 3 \Rightarrow R_f = [0, \sqrt{3}]$

ب) داخل رادیکال: $-1 \leq 2n^2 - 1n \Rightarrow R_f = [-2, +\infty)$

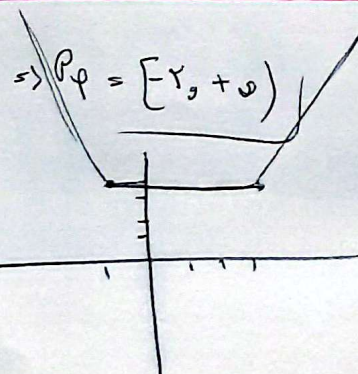
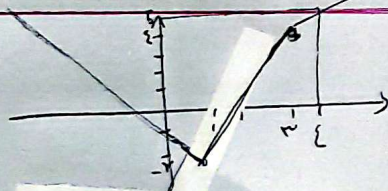
4

الف) $\frac{n^2+1}{n} = n + \frac{1}{n} \rightarrow (-\infty, -2] \cup [2, +\infty) \Rightarrow R_f = \mathbb{R}$

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ب) $\frac{n^2+1}{n} = n + \frac{1}{n} \rightarrow (-\infty, -2] \cup [2, +\infty) \Rightarrow R_f = [1, +\infty)$

الف)

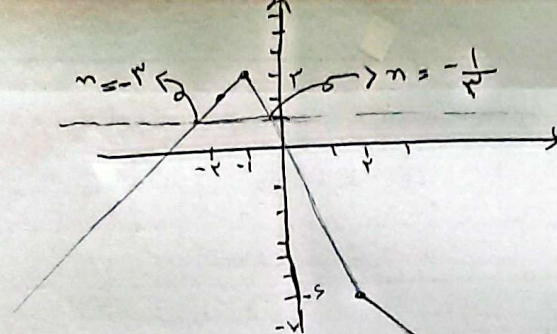


ب)

$\Rightarrow R_f = [\varepsilon, +\infty)$

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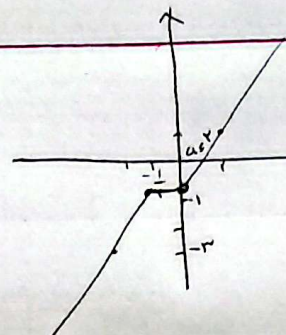
$$y = |n-2| - |n+2|$$



$$\Rightarrow n \in \mathbb{R} - (-2, -\frac{1}{2})$$

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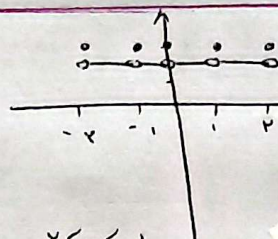
$$y = 2n - |2n+1| + |n|$$



$$\Rightarrow R_f = (-\infty, +\infty)$$

8

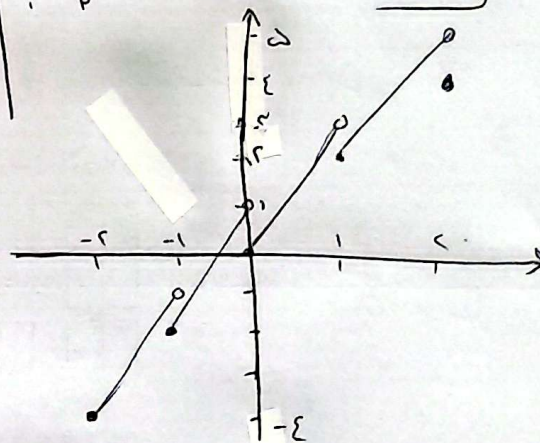
$$\text{الف) } y = 2 + [n] + [-n]$$



$$R_f = \{2, 3\}$$

$$\text{ب) } y = 2n - [n] \quad \begin{array}{l} 2n+2 \\ 2n+1 \\ 2n \\ 2n-1 \\ \hline \varepsilon \end{array}$$

$$\begin{array}{l} -2 \leq n < -1 \\ -1 \leq n < 0 \\ 0 \leq n < 1 \\ 1 \leq n < 2 \\ n = 2 \end{array}$$



$$R_f = \mathbb{R} \rightarrow \text{درست}$$

$$\hookrightarrow \text{در بازه داده شده } R_f = [-2, 2]$$

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$$\text{الف) } \square = \sin n$$

$$\begin{array}{l} \sin n = 1 \rightarrow 1 \\ \sin n = 2 \rightarrow 2 \\ \sin n = \frac{b}{ra} \rightarrow \frac{r}{\varepsilon} \end{array}$$

$$\Rightarrow R_f = [\frac{r}{\varepsilon}, 2]$$

$$\text{ب) } \square = \sin^2 n$$

$$\begin{array}{l} \sin^2 n = 1 \rightarrow 1 \\ \sin^2 n = 0 \rightarrow 0 \\ \sin^2 n = \frac{b}{ra} \rightarrow \frac{1}{r} \end{array}$$

$$\Rightarrow R_f = [0, 1]$$

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