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جواب هاست به باریت نوشتیم با دقت
(بجواب)

(۱) با ارفاق

الف) $\mathbb{R} - \{1\} \Rightarrow \mathbb{R} \setminus \{1\} = R_f$

$\Rightarrow \alpha + \frac{1}{\alpha} > 0 \rightarrow R_f = [r_1 + \infty) \rightarrow$ کامل بنویس

(۲) (۳)

$y^2 + 12y = x^2 + 12x - 1 \Rightarrow x^2 + (12-y)x - (y+1) = 0$

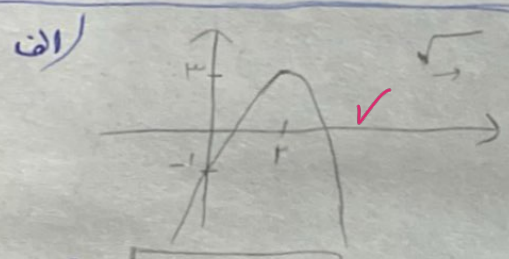
$\Rightarrow x = \frac{y+1 \pm \sqrt{y^2 - 4y + 4 + 4(y+1)}}{2} \rightarrow y^2 + 8y + 12 \geq 0$

$R_f = (-\infty, -4] \cup [-2, +\infty)$

$(y+4)(y+2) \geq 0$
 $\begin{matrix} -4 & -2 \\ + & - & + \end{matrix}$

$y = \frac{(x - \frac{1}{x})^2}{x^2 - x + 1} \rightarrow (?)$

صفحه آخر...



$R_f = [-1, 3]$

دقت!

(۴) (۵)

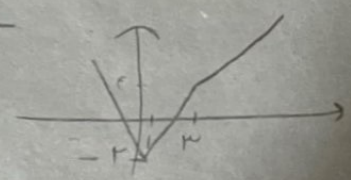
$\Rightarrow \mathbb{R} \setminus R_f$

الف) $x^3 - x + 18 > 0 \quad (?)$

$\Rightarrow \frac{x^3 + 1}{x} > 0 \quad \begin{matrix} 0 \\ -1 & + \end{matrix}$
 $x = 0, \dots, 1$
 $\frac{1}{x-1} = +\infty$

$x^3 = 1 \rightarrow x = 1$
 $R_f = [0, +\infty)$

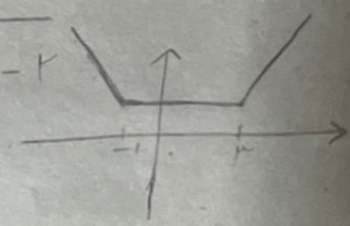
الف) $\frac{1}{-x-1} \mid \frac{x}{x^2-5} \mid x+1$



$R_f = [-1, +\infty)$

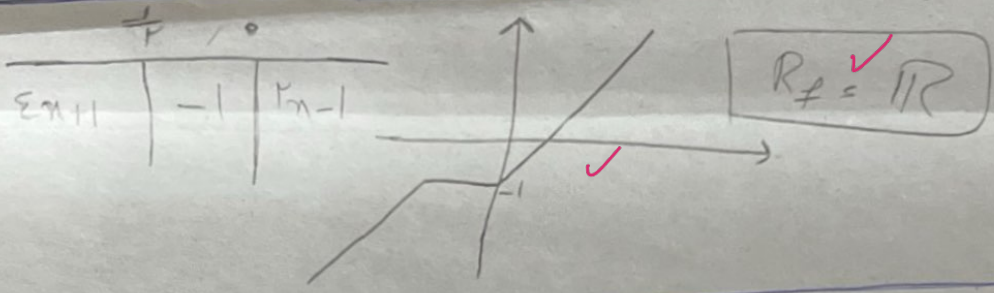
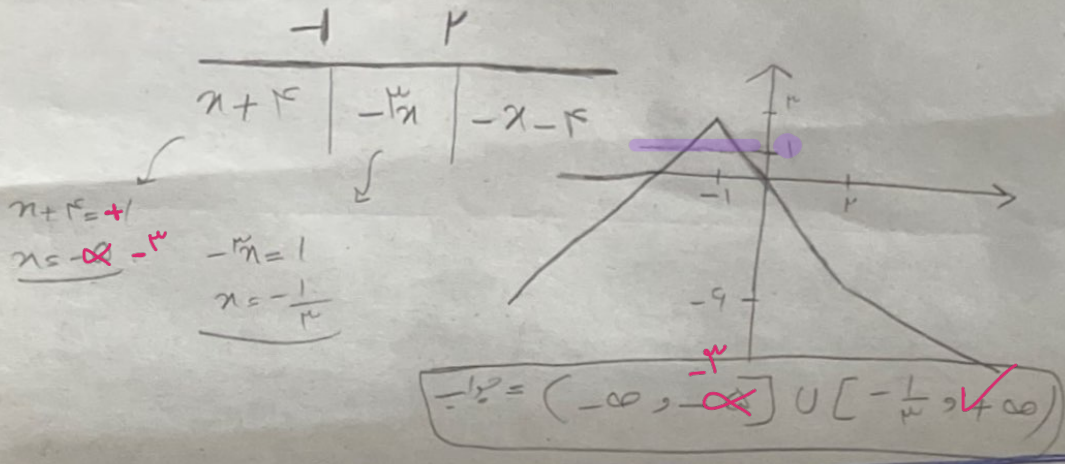
(۶) (۲)

$\Rightarrow \frac{-1}{-x+2} \mid \frac{x}{x^2-5} \mid x-1$

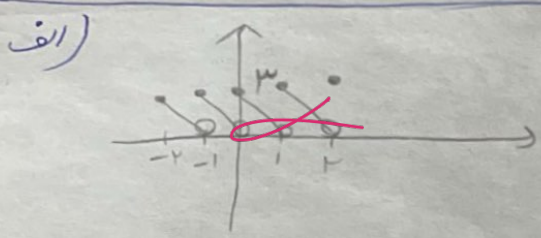


$R_f = [1, +\infty)$

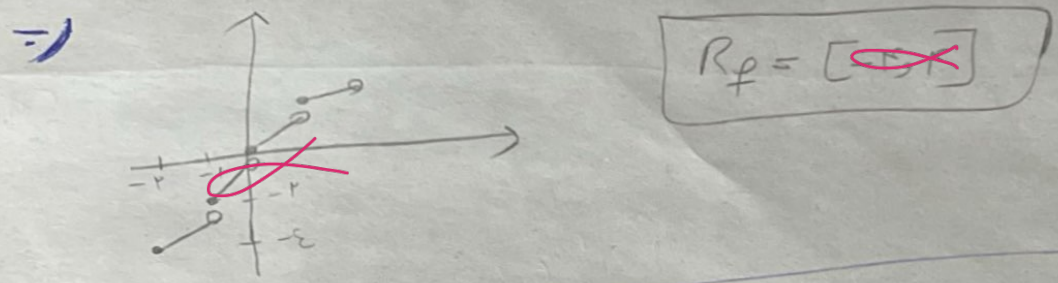
(10) ✓



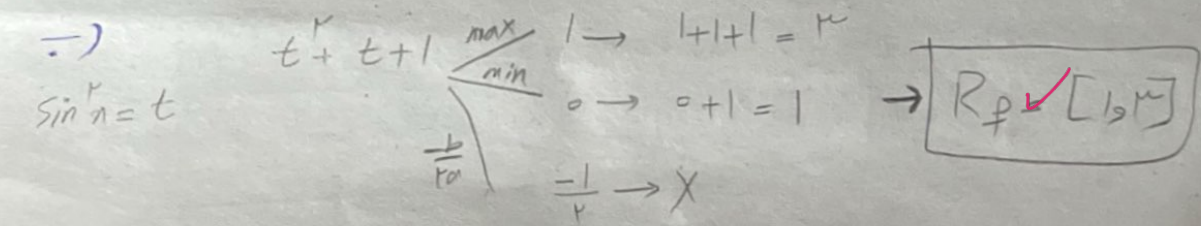
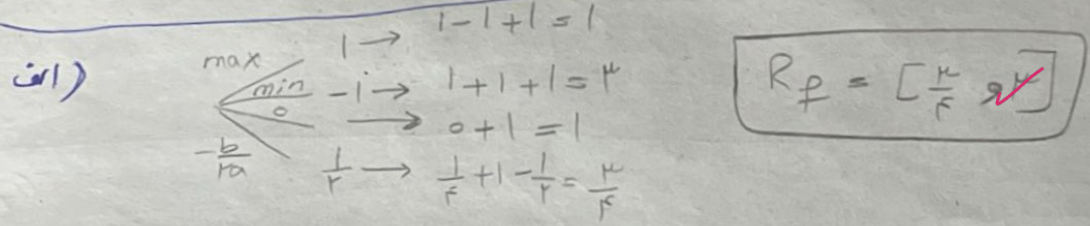
(11) ✓



(12) ✓



(13) ✓



الف $\square = |n| \rightarrow \begin{cases} |n| = 0 \rightarrow y = \frac{-1}{2} \\ |n| = +\infty \rightarrow y = 1 \end{cases} \xrightarrow[\text{مقدار}]{\text{محدوده میانه}} R_y = (-\infty, \frac{-1}{2}] \cup (1, +\infty) - 1$

ب $y = |n| + \frac{1}{|n|} \xrightarrow[\alpha + \frac{1}{\alpha} \geq 2]{\alpha > 0} |n| + \frac{1}{|n|} \geq 2 \rightarrow R_y = [2, +\infty)$

$$f(n) = \frac{(n - \frac{1}{2})^2}{(n - \frac{1}{2})^2 + \frac{3}{4}}$$

۳- مخرج کسر همواره مثبت است پس دامنه $\mathbb{R}$ است

طرفین وسطین $\rightarrow y n^2 - y n + y = n^2 - n + \frac{1}{4} \rightarrow (y-1)n^2 - (y-1)n + y - \frac{1}{4} = 0$

$$n = \frac{y-1 \pm \sqrt{(y-1)^2 - 4(y-1)(y-\frac{1}{4})}}{2(y-1)} \rightarrow \Delta \geq 0 \rightarrow (y-1)(y-1-4y+1) \geq 0$$

$\frac{0}{-} \quad \frac{1}{+} \quad \frac{-}{-} \Rightarrow y = [0, 1]$

غریب n نباید صفر شود یعنی $y \neq 1$ است

و تابع در انزای هیچ مقداری برابر نیست پس برد برابر است با: $R_y = [0, 1)$

می‌توانست از روش مربع هم استفاده کنیم $f(n) = \frac{\square^2}{\square^2 + \frac{3}{4}}$

الف $\max \left| \begin{array}{l} \frac{-b}{2a} = 2 \\ y = 3 \end{array} \right| \Rightarrow R_y = \sqrt{(-\infty, 3]} = [0, \sqrt{3}] - 4$

ب $\min \left| \begin{array}{l} \frac{-b}{2a} = 2 \\ y = -1 \end{array} \right| \Rightarrow R_y = \sqrt{[-1, +\infty)} = [-2, +\infty)$

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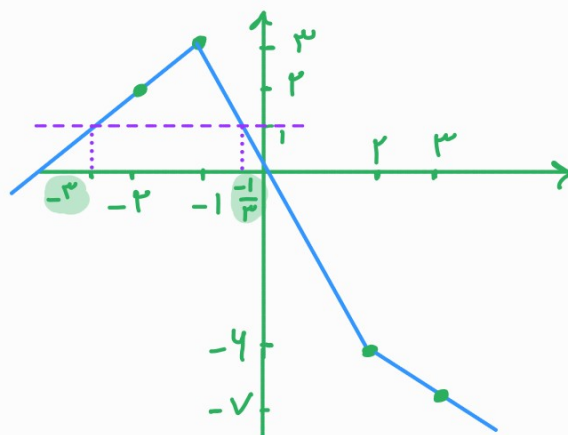
الف) برد توابع چندجمله‌ای از مرتبه فرد برابر $\mathbb{R}$ می‌باشد:

$$R_y = \text{deg}(-\infty, +\infty) = \mathbb{R}$$

ب) $\frac{n^2+1}{n} = n + \frac{1}{n} \xrightarrow[n + \frac{1}{n} \leq -2]{n + \frac{1}{n} \geq 2} R = (-\infty, -2] \cup [2, +\infty)$

$\xrightarrow{\text{deg}_r} R_y = [1, +\infty)$

$$\begin{cases} -n-2 & n \geq 2 \\ -3n & -1 \leq n \leq 2 \\ n+2 & n \leq -1 \end{cases}$$

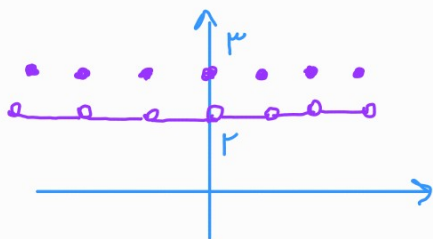


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$$R_y = (-\infty, -3] \cup [\frac{-1}{2}, +\infty)$$

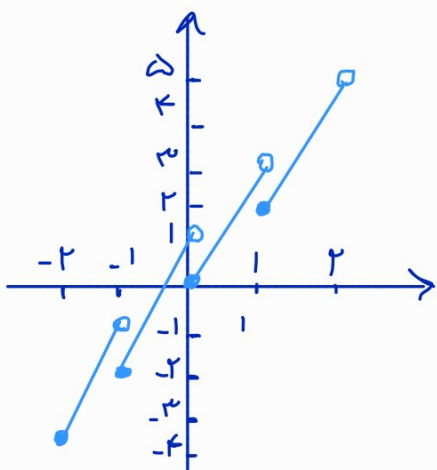
۹ الف)

$$y = [n] + [-n] + 2$$



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

۹ ب)



$$R_y = [-1, \infty)$$