

الف 1. $y = \frac{|x|+1}{|x|-2} \rightarrow y|x|-2y = |x|+1 \rightarrow (y-1)|x| = \frac{1+2y}{y-1} \rightarrow |x| = \frac{1+2y}{y-1}$
 $\frac{-\frac{1}{2}}{+} \frac{1}{-} \frac{1}{+} \rightarrow R = \mathbb{R} - (-\frac{1}{2}, 1]$ (2)

ب $y = \frac{x^2+1}{|x|} \rightarrow |x| + \frac{1}{|x|} \rightarrow R = [2, +\infty)$

الف 2. $y = \frac{x^2+2x-2}{x+3} \rightarrow xy+3y = x^2+2x-2 \rightarrow x^2+(2-y)x-2-3y$ (2)

$\Delta \geq 0 \rightarrow y^2+4-4y+4+12y \geq 0 \rightarrow y^2+8y+8 \geq 0 \rightarrow (y+4)(y+2) \geq 0 \rightarrow R = \mathbb{R} - (-4, -2]$

الف 3. $\frac{x^2-x+\frac{1}{x}}{x^2-x+1} \rightarrow D = \mathbb{R}$ $x^2-x+\frac{1}{x} = yx^2-yx+y = x^2(1-y) + (y-1)x + \frac{1}{x} - y = 0$ (1)

$\rightarrow \Delta \geq 0 \rightarrow (y-1)^2 - 4(1-y)(\frac{1}{x}-y) \geq 0 \rightarrow y^2+1-2y-4y+\frac{4}{x}+4y^2-4y-1 \geq 0 \rightarrow -3y^2+4y \geq 0$

$3y^2-4y \leq 0 \rightarrow y(y-\frac{4}{3}) \rightarrow R = [0, \frac{4}{3}]$ (1)

صفحه آخر...

الف 4. $y = \sqrt{-x^2+2x-1}$ $\rightarrow \frac{-b}{2a} = 2 \rightarrow x=2 \rightarrow y = \sqrt{3} \rightarrow R = [0, \sqrt{3}]$ (2)

ب $\sqrt{2x^2-2x} \rightarrow \frac{-b}{2a} = 2 \rightarrow x=2 \rightarrow y = \sqrt{2} \rightarrow R = [-2, +\infty)$

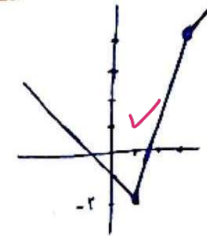
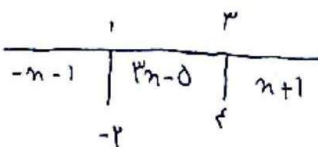
الف 5. $y = \log(x^2-x+1)$ $\rightarrow R = \mathbb{R}$

راه حل اولی

(2)

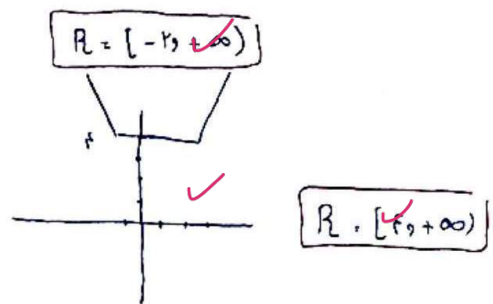
ب $y = \log_r(\frac{x^2+1}{x}) \rightarrow \frac{x^2+1}{x} = (-\infty, -2] \cup [2, +\infty) \rightarrow R = [1, +\infty)$

٧ الف $y = |r_n - r| - |n - r| \rightarrow$

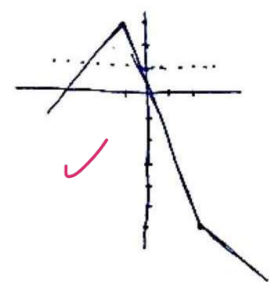
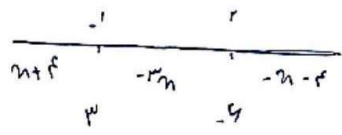


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ب $y = |n - r| + |n + 1|$



٨ $|n - r| - |r_n + r| \leq 1 \rightarrow$

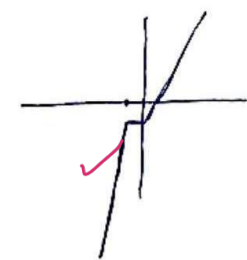
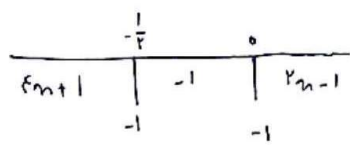


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$-r_n = 1 \rightarrow n = -\frac{1}{r}$
 $n+r=1 \rightarrow n = -r$

$R = [R - (-\frac{1}{r}), \frac{1}{r}]$

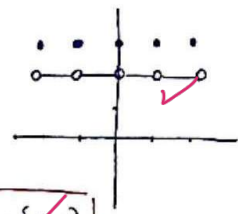
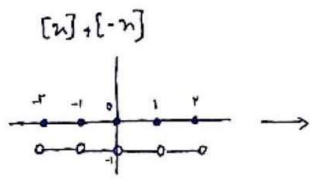
٩ $y = r_n - |r_n + 1| + |n| \rightarrow$



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$R = \mathbb{R}$

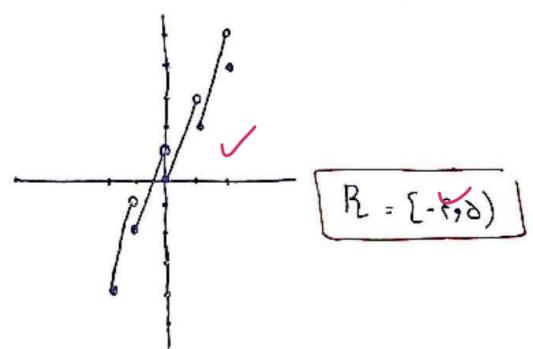
٩ الف $y = [n] + [r - n] \rightarrow r + [n] + [-n]$



(٢)

$R = \{r, r\}$

ب $y = r_n - [n]$



١٠ الف $y = \sin^n n - \sin n + 1$

$R = [\frac{1}{r}, r]$

(٢)

ب $y = \sin^n n + \sin^n n + 1$

$R = [1, r]$

۳- خروجی کسره عوارضی نسبت است پس دامنه IR است

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

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

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

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

غیرب n بنایه صفر شود یعنی $y \neq 1$ است

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

می‌توانست از روش مربع هم استفاده کنیم:

$$f(n) = \frac{\square^2}{\square^2 + \frac{r}{4}}$$