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شماره ششتری کاتب 9

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الف)  $k^3 - 3k^2 + 3k \rightarrow 2 \cdot (k-1)^3 + 1 \rightarrow (k-1)^3 = y-1 \rightarrow k-1 = \sqrt[3]{y-1} \rightarrow k = \sqrt[3]{y-1} + 1$   
 $R_y = \mathbb{R}$

ب)  $y = \frac{1}{k^2 - 2k} \rightarrow k^2 y - 2ky = 1 \rightarrow k^2 y - 2ky - 1 = 0 \rightarrow ky^2 + \varepsilon y = 0 \rightarrow ky(y+1) = 0$   
 $\frac{1}{+|-|+} \rightarrow R_y = (-\infty, -1] \cup [0, +\infty)$

$y = k^2 - \varepsilon k + 1 \rightarrow \frac{-b}{2a} \rightarrow \frac{\varepsilon}{2} = 1 \rightarrow \varepsilon = 2 + 1 \rightarrow 4 \rightarrow R_y = [4, +\infty)$   
 ب)  $-k^2 + 4k + 1 \rightarrow \frac{-b}{2a} = \frac{-4}{-2} = 2 \rightarrow -9 + 11 + 1 = 3 \rightarrow R_y = [3, +\infty)$

ج)  $\varepsilon = \sqrt{k^2 - \varepsilon k - 1} \rightarrow \frac{-b}{2a} = \frac{\varepsilon}{2} = 1 \rightarrow \sqrt{\varepsilon - 1 - 1} \rightarrow R_y = (-\infty, 1]$

د)  $y = \sqrt{4k - k^2} \rightarrow \frac{-b}{2a} = \frac{-4}{-2} = 2 \rightarrow \sqrt{\varepsilon - 1 - 1} \rightarrow R_y = [0, +\infty)$   
 $\frac{-b}{2a} = \frac{-4}{-2} = 2 \rightarrow \sqrt{11 - 9} = \sqrt{2} \rightarrow R_y = [0, 2]$

الف)  $R_y = \mathbb{R} \rightarrow yk^2 - \varepsilon k^2 + 1k + 1$

ب)  $R_y = \mathbb{R} \rightarrow y \cdot k^2 - 4k^2 + 1k + 1$

ج)  $R_y = [0, +\infty) \rightarrow y = \sqrt{k^2 - 4k^2 + 1k + 1}$

د)  $R_y = [0, +\infty) \rightarrow y = (k^2 - 4k^2 + 1k + 1)^2$

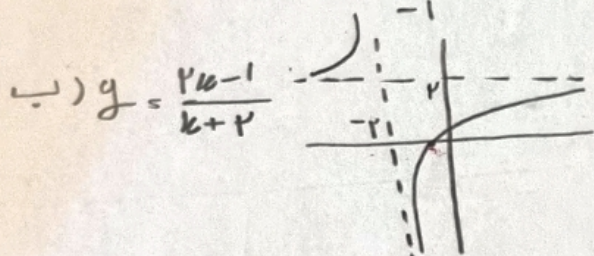
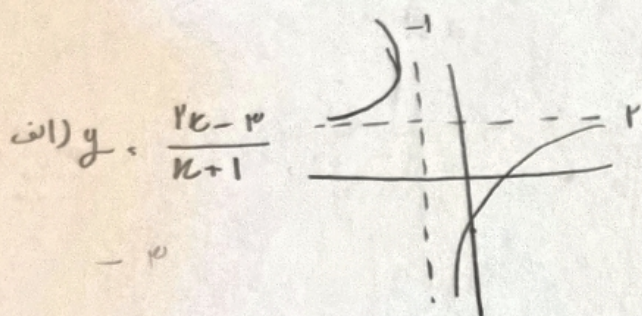
الف)  $y = \frac{k+1}{k-1} \rightarrow R_y = \mathbb{R} - \{1\}$

ب)  $y = \frac{k+1}{k-1} \rightarrow R_y = \mathbb{R} - \{1\}$

الف)  $y = \sqrt{\frac{k+1}{k-1}} \rightarrow R_y = [0, +\infty) - \{\sqrt{2}\}$

ب)  $y = \sqrt{\frac{k+1}{k-1}} \rightarrow \sqrt{\frac{k+1}{k-1}} \rightarrow \sqrt{-1} \rightarrow R_y = [0, +\infty)$

۹ (۶)



۹ (۷)

الف)  $y = \sin x + \frac{1}{\sin x} R_y : (-\infty, -1] \cup [1, +\infty)$

ب)  $y = \frac{x^4 + 1}{x^3} = x + \frac{1}{x^3} = R_y : (-\infty, -1) \cup [1, +\infty)$

ج)  $y = \frac{\sqrt{x^2 + 1}}{\sqrt{x}} \rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = R_y : (-\infty, -1) \cup [1, +\infty)$

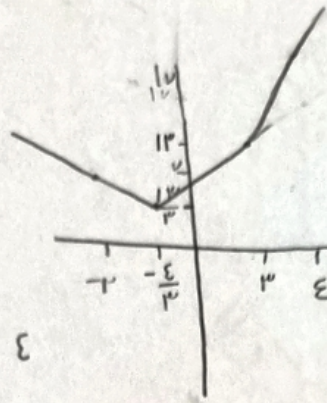
$y = \sqrt{x} + \frac{1}{\sqrt{x}} R_y : [1, +\infty)$

$y = x^2 + 1 + \frac{1}{x^2 + 1} \rightarrow R_y : [\frac{1}{2}, +\infty)$

$y = x^2 + \varepsilon + 1 \rightarrow \sqrt{x^2 + \varepsilon} + \frac{1}{\sqrt{x^2 + \varepsilon}} \xrightarrow{x \rightarrow \frac{1}{\varepsilon}} \sqrt{\frac{1}{\varepsilon}} + \sqrt{\varepsilon} = \frac{2}{\sqrt{\varepsilon}} \rightarrow R_y : [\frac{2}{\sqrt{\varepsilon}}, +\infty)$

$1 + \frac{1}{x} = \frac{x+1}{x}$

$$y = |n-1| + |3n+5|$$



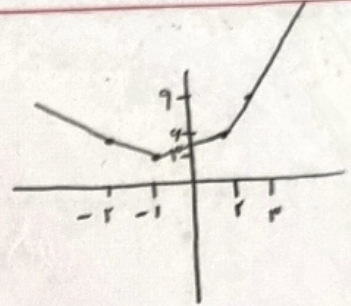
$$Ry = \left[ \frac{13}{3}, +\infty \right)$$

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$$\begin{array}{c|c|c} -\frac{\varepsilon}{3} & 1 & \\ \hline -n+1-1 & -n+1+1 & n-1+1 \\ -\varepsilon n-1 & 1 & \varepsilon n+1 \end{array}$$

الف)  $y = |n-1| + |3n+5|$   
 $Ry = \left[ \frac{13}{3}, +\infty \right)$

$$\begin{array}{c|c|c} -1 & 1 & \\ \hline -n+1-1 & -n+1+1 & n-1+1 \\ -\varepsilon n-1 & 1 & \varepsilon n+1 \end{array}$$



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ب)  $y = |n-1| + |3n+5|$   
 $Ry = \left[ -1, +\infty \right)$

$$\begin{array}{c|c|c} -1 & 1 & \\ \hline -n+1-1 & -n+1+1 & n-1+1 \\ -\varepsilon n-1 & 1 & \varepsilon n+1 \end{array}$$

