

19, 20

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

ب) $y = \frac{1}{x^2 - 3x} = \frac{1}{x(x-3)} \rightarrow (x-3)^2 = \frac{1}{y} \rightarrow x-3 = \pm \sqrt{\frac{1}{y}} \rightarrow x = 3 \pm \sqrt{\frac{1}{y}}$
 $R = (-\infty, -\frac{1}{9}] \cup (0, +\infty) \checkmark$

الف) $y_s = 4$
 $x_s = 3 \rightarrow R = [9, +\infty) \checkmark$

ب) $x_s = 3$
 $y_s = 12 \rightarrow R = (-\infty, 12] \checkmark$

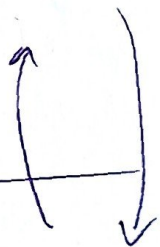
ج) $x_s = 3$
 $y_s = -4 \rightarrow [-4, +\infty) \cap [0, +\infty) = R \checkmark$

د) $x_s = 3$
 $y_s = 9 \rightarrow (-\infty, 9] \cap [0, 3] = R \checkmark$

الف) $y = \frac{x_{n+1}}{x-3} \rightarrow yx - 3y = x_{n+1} \rightarrow x(y-3) = 3y+1 \rightarrow x = \frac{3y+1}{y-3} \rightarrow R = R - \{3\} \checkmark$

ب) $y = \frac{x_{n+1}}{x+1} \rightarrow yx + y = x_{n+1} \rightarrow x(y-1) = 1-y \rightarrow x = \frac{1-y}{y-1} \rightarrow R = R - \{1\} \checkmark$

$R = R - \{1\} = R - \{3\}$



الف) $y = x^3 - 3x^2 + 3x + 1 \rightarrow R = \mathbb{R} \checkmark$

ب) $y = x^3 - 3x^2 + 3x + 2 \rightarrow R = \mathbb{R} \checkmark$

ج) $R = \sqrt{R} = [0, +\infty) \checkmark$

د) $R = \mathbb{R} \cap [0, +\infty) = [0, +\infty) \checkmark$

الف) $y = \sqrt{\frac{x_{n+1}}{x+1}} \rightarrow R = \mathbb{R} - \{1\} \rightarrow R = [0, +\infty) - \{1\} \checkmark$

ب) $y = \sqrt{\frac{x_{n+1}}{x-1}} \rightarrow R = \mathbb{R} - \{1\} \rightarrow R = [0, +\infty) - \{1\} \checkmark$

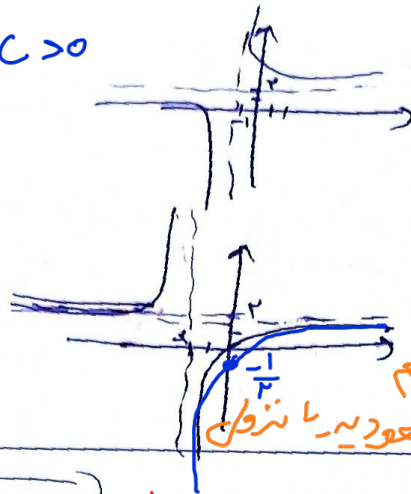
$R(\frac{x_{n+1}}{x-1}) = R - \{1\} \rightarrow R(\frac{x_{n+1}}{x-1}) = [0, +\infty) - \{1\} \checkmark$

$R(\frac{x_{n+1}}{x+1}) = R - \{1\} \rightarrow R(\frac{x_{n+1}}{x+1}) = [0, +\infty) - \{1\} \checkmark$

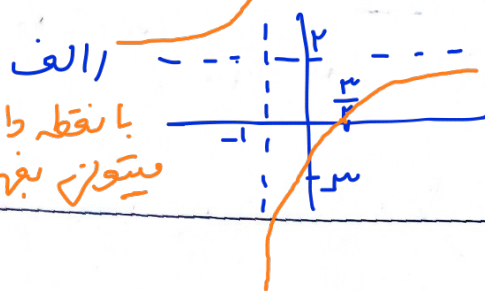
$$ad-bc > 0 \rightarrow \text{معمودی}$$

$$\text{الف) } y = \frac{2x-3}{x+1} \quad \frac{a}{c} = 2$$

$$\text{ب) } y = \frac{2x-1}{x+2} \quad \frac{a}{c} = 2$$



محل برخورد منوالار با محورهای
و ی تو رسم نمودار کنید
لکه خصوصیات و اسه امتحان بنایید



(1, 2.5)

$$\text{الف) } (-\infty, -2] \cup [2, +\infty)$$

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

$$\text{ج) } y = \frac{\sqrt[3]{x^3+1}}{\sqrt[3]{x}} = \sqrt[3]{x} + \frac{1}{\sqrt[3]{x}} \rightarrow R = (-\infty, -2] \cup [2, +\infty)$$

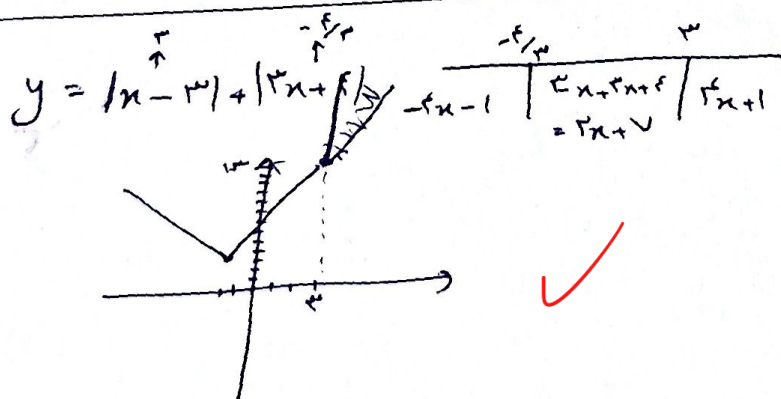
$$\text{د) } y = \sqrt{x} + \frac{1}{\sqrt{x}} \rightarrow R = [2, +\infty)$$

$$\text{الف) } y = x^2 + \frac{1}{x^2+3} \rightarrow y+3 = (x^2+3) + \frac{1}{(x^2+3)} \rightarrow R = [2+3, +\infty) = [5, +\infty)$$

$$\min(x^2+3) + \frac{1}{(x^2+3)} = 2 + \frac{1}{2} \rightarrow 2 + \frac{1}{2} \leq (x^2+3) + \frac{1}{(x^2+3)} \leq +\infty \rightarrow \frac{5}{2} \leq y+3 \leq +\infty \rightarrow \frac{1}{2} \leq y \leq +\infty$$

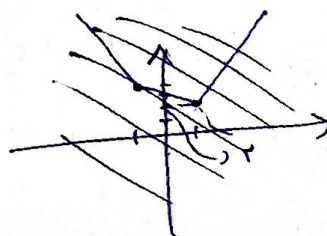
$$\rightarrow R = [\frac{1}{2}, +\infty)$$

$$\text{ب) } y = \frac{x^2+4}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \rightarrow \min = 2 + \frac{1}{2} = 2.5 \rightarrow R = [2.5, +\infty)$$



$$\text{الف) } y = |x-2| + |2x+1| \rightarrow R = [3, +\infty)$$

$$\text{ب) } |x-2| - |x+1|$$



$$R = [3, +\infty)$$

