

15, 15

Year. Month. Date. ()

صفحة ١٥

بازم به آید

امیرین زید

الف) $y = x^3 - 3x^2 + 3x = (x-1)^3 + 1 = y \Rightarrow y-1 = (x-1)^3 \Rightarrow x-1 = \sqrt[3]{y-1}$ (1)

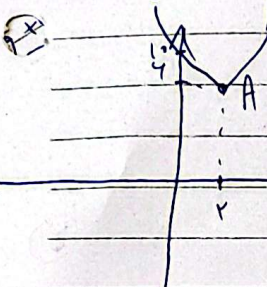
$\Rightarrow x = \sqrt[3]{y-1} + 1 \rightarrow R_f = \mathbb{R}$ ✓

15, 15

ب) $y = \frac{1}{x^2 - 4} \rightarrow y(x^2 - 4) = 1 \Rightarrow x(yx - y) = 1$

$\Rightarrow x = \frac{1}{yx - y}$ (2) $x = \frac{y \pm \sqrt{4y^2 + 4y}}{2y} \geq 0 \Rightarrow \frac{-1}{+1} - \frac{0}{+1}$
(3) $y \neq 0$

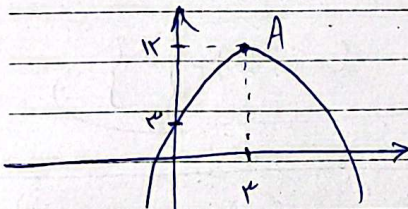
الف) $y = x^2 - 4x + 1 \rightarrow \frac{-b}{2a} = (2), \frac{-\Delta}{4a} = (4) \rightarrow A = \frac{1}{4}$ (2)



و جنبه $\rightarrow$ است $\rightarrow$ min

$\Rightarrow R_f = [4, +\infty)$ ✓

ب) $y = -x^2 + 4x + 4 \rightarrow \frac{-b}{2a} = \frac{-4}{-2} = (2), \frac{-\Delta}{4a} = (12) \rightarrow A = \frac{12}{4}$



و جنبه $\rightarrow$ است $\rightarrow$ max

$\Rightarrow R_f = (-\infty, 12]$ ✓

ج) $y = \sqrt{x^2 - 4x - 3}$ $\xrightarrow{\text{دسته دوم}} x^2 - 4x - 3 \rightarrow \frac{-b}{2a} = (2), \frac{-\Delta}{4a} = (-7)$ (2)

$\rightarrow R_y = x^2 - 4x - 3 = [-7, +\infty) \rightarrow R_y = \sqrt{x^2 - 4x - 3} = [0, +\infty)$ ✓

د) $y = \sqrt{4x - x^2} \rightarrow \begin{cases} a < 0 \Rightarrow \text{است max} \\ \frac{-b}{2a} = 2, \frac{-\Delta}{4a} = 4 \end{cases} \rightarrow R_y = 4x - x^2 = (-\infty, 4]$

$\Rightarrow R_y = \sqrt{4x - x^2} = \sqrt{(-\infty, 4]} = [0, 2]$ ✓

الف) $y = x^3 - 3x^2 + 2x + 1 \rightarrow \text{نقطه‌های بحرانی و انحنای دوم} \rightarrow R_p = \mathbb{R} \checkmark$ (۳) (۲)

ب) $y = x^4 - 4x^3 + 3x^2 + 2 \rightarrow \text{نقطه‌های بحرانی و انحنای دوم} \rightarrow R_p = \mathbb{R} \checkmark$

ج) $y = \sqrt{x^4 - 4x^3 + 3x^2 + 1} \rightarrow \sqrt{\mathbb{R}} = [0, +\infty) = R_p \checkmark$

د) $y = (x^3 - 3x^2 + 2x + 1)^2 \rightarrow (\mathbb{R})^2 = [0, +\infty) = R_p \checkmark$

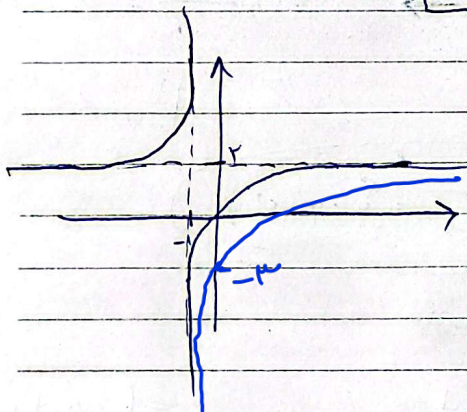
الف) $y = \frac{x^3 + 1}{x - 2} \Rightarrow R_p = \mathbb{R} - \{2\} \checkmark$ (۴) (۲)

ب) $y = \frac{x^3 + 1}{x + 1} \Rightarrow \mathbb{R} - \{-1\} = R_p \checkmark$

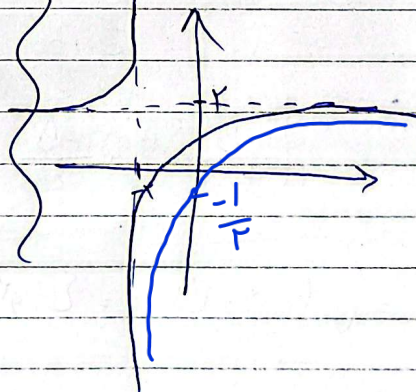
الف) $y = \sqrt{\frac{x^3 + 1}{x + 1}} \rightarrow R_p = [0, +\infty) - \{-1\} \checkmark$ (۵) باید از خط عمود رادیکال بیرون

ب) $y = \sqrt{\frac{x^3 + 1}{2 - x}} = \sqrt{\frac{x^3 + 1}{-x + 2}} \rightarrow R_p = [0, +\infty) - \{2\} \checkmark$ (۶) $R = [0, +\infty)$

الف) $y = \frac{x^3 - 1}{x + 1}$
 - ضرایب عمودی $\rightarrow -1 = (۱)$
 - ضرایب افقی $\rightarrow \frac{a}{c} = 2 = (۲)$ (۷) (۱، ۵)



ب) $y = \frac{x^3 - 1}{x + 2}$
 - ضرایب عمودی $\rightarrow -2 = (۱)$
 - ضرایب افقی $\rightarrow 2 = (۲)$



محل برخورد با محورهای مختصات

الف) $y = \sin x + \frac{1}{\sin x} \rightarrow R_f = (-\infty, -2] \cup [2, +\infty)$ ✓ (2)

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

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

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

هـ) $y = a^x + \frac{1}{a^x} \rightarrow R_f = [2, +\infty)$ ✓
 (1) $\frac{10}{x} - 3 = \frac{1}{x} \rightarrow R = [\frac{1}{x}, +\infty)$
 (2) $\frac{10}{x} - 3 = \frac{1}{x} \rightarrow R = [\frac{1}{x}, +\infty)$
 (3) $\frac{10}{x} - 3 = \frac{1}{x} \rightarrow R = [\frac{1}{x}, +\infty)$

و) $y = \frac{x^2+5}{\sqrt{x^2+4}} = \frac{x^2+4+1}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \rightarrow R_f = [\frac{5}{2}, +\infty)$ ✓
 min = 4

