

الف) $y = x^3 - 3x^2 + 3x \rightarrow Rf = R$ (صریح فرد)

①

ب) $y = \frac{1}{x^2 - 2x}$ $\frac{y x^2 - 2y x - 1 = 0}{\frac{y x^2}{x^2 x^2} \quad \frac{-2y x}{2x} \quad \frac{-1}{C}} \xrightarrow{\Delta \geq 0} 4y^2 - 4(y)(-1)$

$4y^2 + 4y \geq 0$
 $4y(y+1) \geq 0$ $\frac{-1}{1+\phi-\phi} + \frac{(-\infty, -1] \cup (0, +\infty) = Rf$

جواب: با صریح - این نیز صریح است

الف) $y = x^2 - 4x + 10$ $\Delta = 16 - 40 = -24$ ب) $y = -x^2 + 4x + 3$ ②

$y_{Ext} = \frac{-\Delta}{4a} = \frac{24}{4} = 6$ $[4, +\infty)$ $y_{Ext} = \frac{-\Delta}{4a} = \frac{-24}{-4} = 6$ $\Delta = 16 - 4(-1)(3) = 28$

$\Delta = 16 - 4(-1)(3) = 28$ $4a \rightarrow \frac{-4}{-4} = 1$ $(-\infty, 1]$

ج) $y = \sqrt{x^2 - 4x - 3}$ $y_{Ext} = \frac{-24}{4} = -6$ $\Delta = 16 - 4(-1)(3) = 28$

$\sqrt{[-6, +\infty)} \rightarrow [0, +\infty)$ $y_{Ext} = \frac{-24}{-4} = 6$ $\sqrt{(-\infty, 6]} \rightarrow [0, 6]$

الف) $y = x^3 - 5x^2 + 2x + 1$ (R) ب) $y = x^3 - 4x^2 + 3x + 2$ (R) ③

ج) $y = \sqrt{x^3 - 4x^2 + 5x + 1} \rightarrow \sqrt{R} = [0, +\infty)$

$\rightarrow y = (x^3 - 4x^2 + 5x + 1)^2 \rightarrow [0, +\infty)$

چون توان دو دارد عبارت همواره نامنفی است

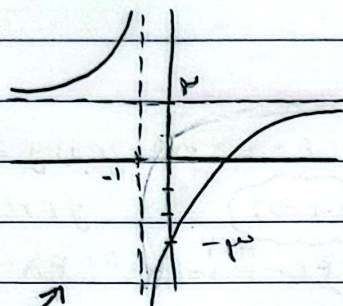
الف) $y = \frac{1^3x+1}{x-2}$ $RP = \mathbb{R} - \{2\}$ ب) $y = \frac{2x+1}{x+1}$ $RP = \mathbb{R} - \{-1\}$ (١٤)

الف) $y = \sqrt{\frac{2x+1}{x+1}}$ $\sqrt{\mathbb{R} - \{-1\}} \Rightarrow [0, +\infty) - \sqrt{2}$ (١٥)

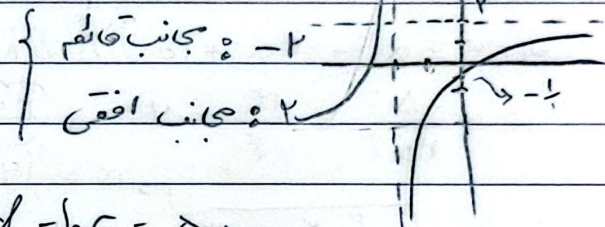
ب) $y = \sqrt{\frac{3x+1}{2-x}}$ $\sqrt{\mathbb{R} - \{-1\}} \Rightarrow [0, +\infty)$

الف) $y = \frac{2x^a - 3^b}{x+1}$

مخرج : $\frac{a}{c} = -1$
مقام : $\frac{a}{c} = 2$



ب) $y = \frac{2x-1}{x+2}$



$ad - bc = 2 - (-3) = 5 > 0$ صعودي

$ad - bc = 2 - (-1) = 3 > 0$

الف) $\sin x + \frac{1}{\sin x}$ $(-\infty, -2] \cup [2, +\infty)$ (١٧)

ب) $\frac{x^4+1}{x^3} = x + \frac{1}{x^3}$ $(-\infty, -2] \cup [2, +\infty)$

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

د) $\sqrt{x} + \frac{1}{\sqrt{x}}$ $[2, +\infty)$

s.a.m

$$\text{الف) } y = x^p + \frac{1}{x^p + p} \quad \text{ب) } y = \frac{x^p + p + 1}{\sqrt{x^p + p}} \quad \text{ج) } y = \frac{x^p + p + 1}{\sqrt{x^p + p}} \quad \text{د) } y = \frac{x^p + p + 1}{\sqrt{x^p + p}}$$

$$RF = [p^{\frac{1}{p}}, 2 + \infty) \quad [p, 2 + \infty)$$

$$x^p + p \rightarrow \min = -\frac{\Delta}{p} = \frac{14}{p} = p \rightarrow \min = 4$$

$$\Delta = 0 - p(1)(p) = -p^2$$

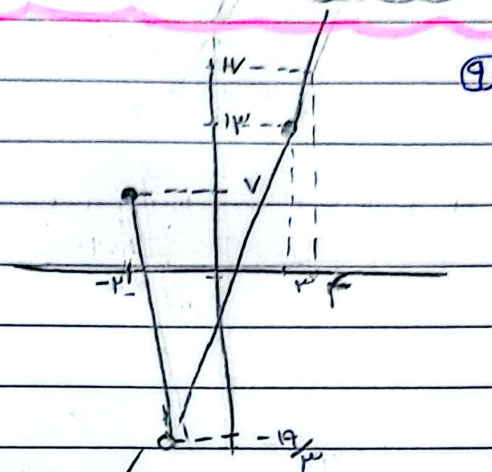
$$[0, 2 + \infty)$$

$$y = |x - p| + |p - x + p|$$

$$x < -\frac{p}{p} \rightarrow p - x - p - x - p = -p - 1$$

$$-\frac{p}{p} < x < p \rightarrow p - x + p - x + p = p - x + p$$

$$x > p \rightarrow x - p + p - x + p = p - x + p$$



1 + 1

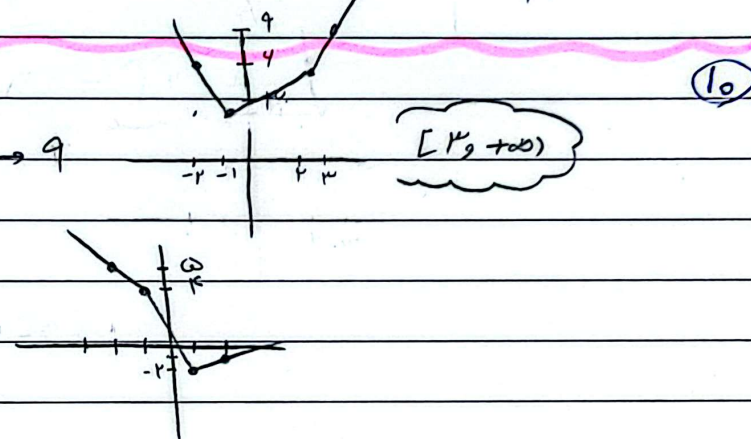
$$\text{الف) } y = |x - p| + |p - x + p|$$

$$-p \rightarrow 1 \quad -1 \rightarrow p \quad p \rightarrow 1 \quad p \rightarrow 1$$

$$\text{ب) } y = |x - p| - |x + 1|$$

$$-p \rightarrow \infty \quad -1 \rightarrow p \quad 1 \rightarrow -p \quad p \rightarrow -1$$

$$[-p, 2 + \infty)$$



s.a.m