نیما نامعطایی - یازدهم دهم B

① الف) $x^3 - 3x^2 + 3x + 1 - 1 = (x-1)^3 + 1 = y$

$\sqrt[3]{y-1} = x - 1$

$x = \sqrt[3]{y-1} + 1$

$R_f = \mathbb{R}$

ب) $y = \frac{1}{x^2 - 2x} \rightsquigarrow yx^2 - 2yx = 1$

$x^2y - x2y - 1 = 0 \Rightarrow \Delta = 4y^2 + 4y \geq 0$

$R_f = (-\infty, -1] \cup [0, +\infty) \swarrow 4y(y+1) \geq 0$ $\quad + \underset{-1}{|} - \underset{0}{|} +$

② الف) $y = x^2 - 4x + 10 \Rightarrow \underbrace{(x^2 - 4x + 4)}_{[0,+\infty)} + 6 \Rightarrow R_f = [6, +\infty)$

ب) $y = -x^2 + 6x + 3 \Rightarrow \underbrace{-(x^2 - 6x + 9)}_{(-\infty, 0]} + 12 \Rightarrow R_f = (-\infty, 12]$

ج) $y = \sqrt{x^2 - 4x - 3} \rightarrow (x^2 - 4x + 4) - 7 \Rightarrow \sqrt{[-7, +\infty)} = [0, +\infty)$

د) $y = \sqrt{6x - x^2} \rightarrow \underbrace{(-x^2 + 6x - 9)}_{\underbrace{-(x^2 - 6x + 9)}_{(-\infty, 0]}} + 9 \Rightarrow \sqrt{(-\infty, 9]} = [0, 3]$

③ $y = x^3 - 5x^2 + 2x + 1 \Rightarrow \mathbb{R} = R_f \qquad y = x^7 - 6x^4 + 3x + 2 \Rightarrow \mathbb{R} = R_f$

$y = \sqrt{x^7 - 6x^2 + 5x + 1} \Rightarrow \sqrt{\mathbb{R}} = [0, +\infty) = R_f$

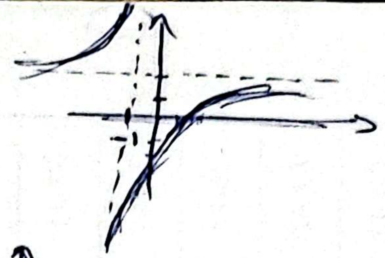
$y = (x^5 - 4x^2 + 3x + 1)^2 \Rightarrow \mathbb{R}^2 = [0, +\infty) = R_f$

④ $y = \frac{3x+1}{x-2} \quad \mathbb{R} - \{3\} \qquad y = \frac{2x+1}{x+1} \quad \mathbb{R} - \{2\}$

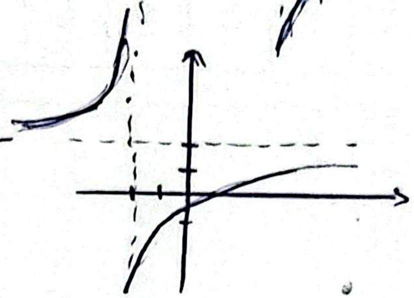
⑤ $\sqrt{\frac{2x+4}{x+1}}$ ⤳ هموگرافیک زیر رادیکال $\Rightarrow \sqrt{\mathbb{R} - \{2\}} = [0, +\infty) - \{\sqrt{2}\}$

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

(6) $y = \dfrac{2x-3}{x+1}$



$y = \dfrac{2x-1}{x+2}$



(7) $y = \sin x + \dfrac{1}{\sin x} \Longrightarrow R_f = (-\infty, -2] \cup [2, +\infty)$

$y = x^5 + \dfrac{1}{x^5} \Longrightarrow R_f = (-\infty, -2] \cup [2, +\infty)$

$y = \sqrt[3]{x} + \dfrac{1}{\sqrt[3]{x}} \Longrightarrow R_f = (-\infty, -2] \cup [2, +\infty)$

$y = \sqrt{x} + \dfrac{1}{\sqrt{x}} \Longrightarrow R_f = [2, +\infty)$

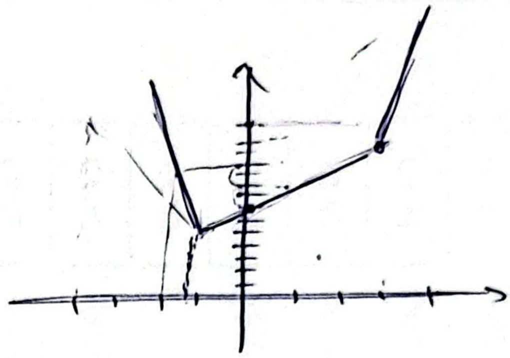
(8) $y = x^2 + \dfrac{1}{x^2+4} \Longrightarrow \underbrace{x^2 + 4 + \dfrac{1}{x^2+4}} - 4 \Longrightarrow \left[\dfrac{1}{4}, +\infty\right)$

$\min = 4 + \dfrac{1}{4} = 1./4$

$\dfrac{x^2+5}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \dfrac{1}{\sqrt{x^2+4}} \Longrightarrow \min_{x=0} \; 2 + \dfrac{1}{2} = 2.5 \Rightarrow R_f = [2.5, +\infty)$

$\dfrac{x^2+4+1}{\sqrt{x^2+4}} \quad \dfrac{1}{\sqrt{x^2+4}}$

۹) $y = |x-۳| + |۳x+۴|$



$-۴/۳$, ۳

$۴x+۱$

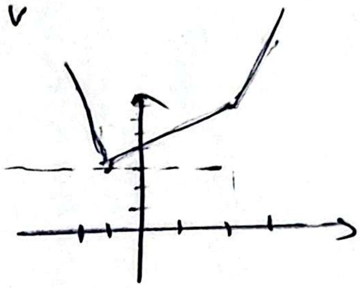
~~$۳-x-۳x-۴$~~

$-۴x-۱$

~~$۳-x+۳x+۴$~~

$۲x+۷$

۱۰) $y = |x-۲| + |۲x+۲|$



$[۳,+\infty)$

$y = |۲x-۲| + |x+۱|$

-۱ , ۱

~~$۲-۲x-x-۱$~~

$-۳x+۱$

$۲x-۲+x+۱$

$۳x-۱$

~~$۲-۲x+x+۱$~~

$-x+۳$

min $\Rightarrow -۱+۳=۲$

$R_f = [۲,+\infty)$