نیما عطایی - یازدهم تجربی B

19,25

۱) 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) $y=\frac{1}{x^2-2x} \rightarrow yx^2-2yx=1$

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

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

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

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

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

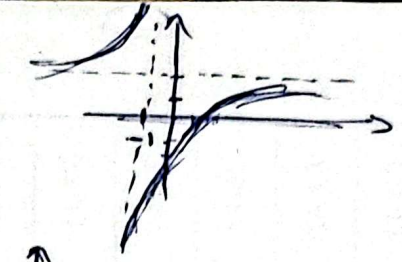
$y=(x^5-4x^2+3x+1)^2 \Rightarrow \mathbb{R}^2=[0,+\infty)=R_f$

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

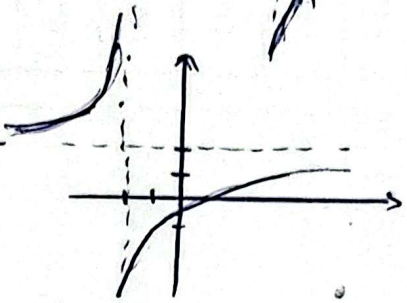
۵) $\sqrt{\frac{2x+4}{x+1}}$ ← هموگرافیک زیر رادیکال $\Rightarrow \sqrt{\mathbb{R}-\{2\}}=[0,+\infty)-\{\sqrt{2}\}$

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

۶) $y = \frac{x^2 - 2}{x + 1}$



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



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

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

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

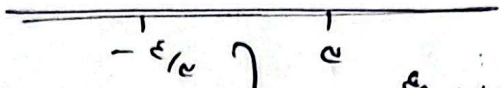
$y = \sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow R_f = [2, +\infty)$

۸) $y = x^2 + \frac{1}{x^2 + a} \Rightarrow \underbrace{x^2 + a + \frac{1}{x^2 + a}}_{\min = 0 + \frac{1}{a} = \frac{1}{a}} - a \Rightarrow \left[\frac{1}{a}, +\infty\right)$

$\frac{x^2 + a}{\sqrt{x^2 + \epsilon}} = \sqrt{x^2 + \epsilon} + \frac{1}{\sqrt{x^2 + \epsilon}} \Rightarrow \min_{x=0} 2 + \frac{1}{2} = 2.5 \Rightarrow R_f = [2.5, +\infty)$

$\frac{x^2 + \epsilon + 1}{\sqrt{x^2 + \epsilon}} \quad \sqrt{x^2 + \epsilon}$

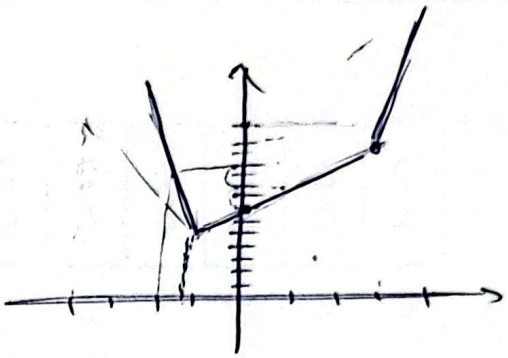
۹) $y = |x-۳| + |۲x+۴|$



$x \le -۲$: $-x+۳-۲x-۴$ → $-۳x-۱$

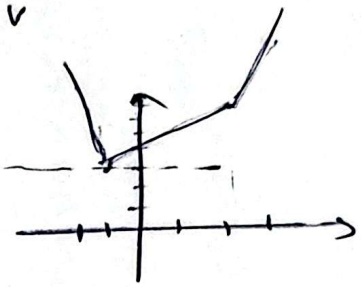
$-۲ < x < ۳$: $-x+۳+۲x+۴$ → $x+۷$

$x \ge ۳$: $x-۳+۲x+۴$ → $۳x+۱$



۱۰) $y = |x-۲| + |x+۲|$

$[۰, +\infty)$



$x \le -۲$: $-x+۲-x-۲$ → $-۲x$

$-۲ < x < ۲$: $-x+۲+x+۲$ → ۴

$x \ge ۲$: $x-۲+x+۲$ → $۲x$

۱٫۲۵

$y = |۲x-۲| + |x+۱|$

$x \le -۱$: $-۲x+۲-x-۱$ → $-۳x+۱$

$-۱ < x < ۱$: $-۲x+۲+x+۱$ → $-x+۳$

$x \ge ۱$: $۲x-۲+x+۱$ → $۳x-۱$

$\min \Rightarrow -۱+۳ = ۲$

$R_f = [۲, +\infty)$