روژینا فرازان ۲۵ بنام خدا تکلیف شماره ۹ دهم رشته C

۱-

الف) $y = x^2 - 5 \rightarrow y + 5 = x^2 \Rightarrow x = \pm\sqrt{y+5}$

$y + 5 \geq 0$

$y \geq -5 \Rightarrow y = [-5, +\infty)$

ب) $y = x^3 + 1 \rightarrow y - 1 = x^3 \Rightarrow x = \sqrt[3]{y-1} \Rightarrow y \in \mathbb{R}$

۲-

الف) $y = x^2 - 4x + 6 \rightarrow y = (x-2)^2 + 2 \Rightarrow y - 2 = (x-2)^2$

$(x-2) = \pm\sqrt{y-2} \Rightarrow x = \pm\sqrt{y-2} + 2 \Rightarrow y - 2 \geq 0$

$y \geq 2 \Rightarrow R_f = [2, +\infty)$

ب) $y = x^2 - 5x + 1 \rightarrow y = (x - \frac{5}{2})^2 - \frac{21}{4} \rightarrow y + \frac{21}{4} = (x - \frac{5}{2})^2$

$x - \frac{5}{2} = \pm\sqrt{y + \frac{21}{4}} \rightarrow x = \pm\sqrt{y + \frac{21}{4}} + \frac{5}{2} \Rightarrow y + \frac{21}{4} \geq 0$

$y \geq -\frac{21}{4} \Rightarrow R_f = [-\frac{21}{4}, +\infty)$

۳-

الف) $y = \frac{x^2+3}{x^2-2} \Rightarrow yx^2 - 2y = x^2 + 3 \rightarrow yx^2 - x^2 - 2y - 3 = 0$

$x^2(y-1) - 2y - 3 = 0 \rightarrow x^2(y-1) = 2y + 3 \rightarrow x^2 = \frac{2y+3}{y-1} \Rightarrow$

$x = \pm\sqrt{\frac{2y+3}{y-1}} \geq 0$

$-\frac{3}{2}$		1	
+	−		+

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

ب) $y = \frac{2|x|+1}{|x|-4} \Rightarrow y|x| - 4y = 2|x| + 1 \Rightarrow y|x| - 2|x| = 4y + 1$

$\Rightarrow |x|(y-2) = 4y + 1 \rightarrow |x| = \frac{4y+1}{y-2}$ (مثبت و صفر) $\Rightarrow$

$-\frac{1}{4}$		2	
+	−		+

$R_f = (-\infty, -\frac{1}{4}] \cup (2, +\infty)$

4-

$y=\frac{1}{x^2-4x} \rightarrow yx^2-4xy=1 \rightarrow \underbrace{y}_{a}x^2\underbrace{-4y}_{b}x\underbrace{-1}_{c}=0$ $\quad a=y \quad b=-4y \quad c=-1$

$\Delta=(-4y)^2-(4\times -1\times y)=(-4y)^2+4y$ $\quad -\frac{4}{16}=-\frac{1}{4}$

$x=\frac{-(-4y)\pm\sqrt{(-4y)^2+4y}}{2y} \rightarrow 16y^2+4y\geq 0 \rightarrow y(16y+4)\geq 0$

$y\neq 0$ $\quad -\frac{1}{4} \quad 0 \quad + \; - \; +$

$R_f=(-\infty,-\frac{1}{4}]\cup(0,+\infty)$

5-

الف) $y=x^2-6x+2$

$a>0 \rightarrow \min \Rightarrow R_f=[-7,+\infty)$

$y_{min}=\frac{-\Delta}{4a}=\frac{-(b^2-4ac)}{4a}=\frac{-(36-(4\times 2\times 1))}{4}=\frac{-28}{4}=-7$

ب) $y=-x^2+4x+2$

$a<0 \rightarrow \max \Rightarrow R_f(-\infty,6]$

$y_{max}=\frac{-\Delta}{4a}=\frac{-(b^2-4ac)}{4a}=\frac{-(16-(4\times 2\times -1))}{-4}=\frac{-24}{-4}=+6$

6-

الف) $y=\sqrt{x^2-6x+2}$

$a>0 \rightarrow \min \Rightarrow R_f=[-7,+\infty) \Rightarrow \sqrt{[-7,+\infty)} \overset{R_f}{\Rightarrow} [0,+\infty)$

$y_{min}=\frac{-\Delta}{4a}=\frac{-(36-(4\times 2\times 1))}{4}=-7$

ب) $y=\sqrt{-x^2+4x+10} \Rightarrow$

$a<0 \rightarrow \max - R_f - \sqrt{(-\infty,14]} \Rightarrow [0,\sqrt{14}]$

$y_{max}=\frac{-\Delta}{4a}=\frac{-(16-(4\times 10\times -1))}{-4}=\frac{56}{4}=14$

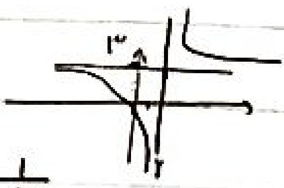
7-

الف) $y=x^3+3x^4+2x+1 \Rightarrow R_f=\mathbb{R}$ بزرگترین توان

ب) $y=\sqrt{x^5+4x^2+6x+1} \Rightarrow \sqrt{\mathbb{R}}=[0,+\infty)$ آن فرد است

8-

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



مجانب افقی $=\frac{a}{c}=\frac{3}{1}=3 \rightarrow x=0 \Rightarrow \frac{1}{-2}$

مجانب قائم $=x-2=0 \rightarrow x=2$

ب) $y=\sqrt{\frac{4x+1}{x+3}} \to \sqrt{R-\{-3\}} \Rightarrow [0,2)\cup(2,+\infty)$

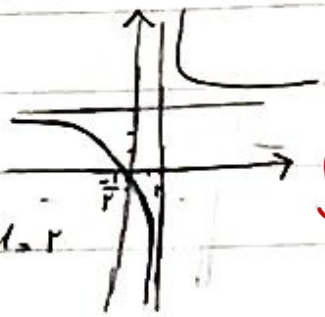
$R-\{-3\}$

$x_0 \to \frac{1}{3}$

الف) $y=\frac{3x+1}{x-2} \Rightarrow$ مجانب افقی $\frac{a}{c}=3$

مجانب عمودی $\Rightarrow x-2=0 \to x=2$

$x_0 \to y_0 \to \frac{-1}{2}$



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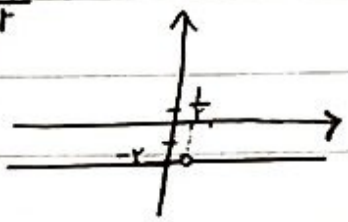
ب) $\frac{4x-2}{1-2x} \Rightarrow \frac{2(2x-1)}{1-2x}=-2$

$1-2x=0$

$1=2x$

$x \neq \frac{1}{2}$



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۱۰- الف) $y=\cos^2 x+\frac{1}{\cos^2 x} \Rightarrow \cos^2 x>0 \Rightarrow R_f=[2,+\infty)$

ب) $y=\sqrt[3]{\frac{x^2+1}{x}} \Rightarrow \sqrt[3]{\underbrace{x+\frac{1}{x}}_{\in R}} \Rightarrow \sqrt[3]{(-\infty,-2]\cup[2,+\infty)} \Rightarrow$

$R_f=(-\infty,\sqrt[3]{-2}]\cup[\sqrt[3]{2},+\infty)$