نام و نام خانوادگی ...آرین ... کلاس 12B پاسخنامه تشریحی تکلیف شماره ...۲...

$y=\frac{x^2+x+2}{x-1} \Rightarrow yx-y=x^2+x+2 \Rightarrow 0=x^2+(1-y)x+2+y=0$ $\Rightarrow \Delta\geq 0 \Rightarrow (1-y)^2-4(2+y)\geq 0 \Rightarrow y^2-2y+1-8-4y\geq 0$ $\Rightarrow y^2-6y-7\geq 0 \quad + \; -1 \; - \; 7 \; + \Rightarrow \boxed{y\in(-\infty,-1]\cup[7,+\infty)}$	۱
الف) $y=2x^2-5x+1 \quad x_s=\frac{5}{4} \Rightarrow y_s=2(\frac{5}{4})^2-5(\frac{5}{4})+1=1 \quad R_y=[1,+\infty)$ ب) $y=\sqrt{-x^2+6x-5} \quad x_s=-\frac{b}{2a}=3 \quad y_s=4 \quad y=\sqrt{(-\infty,4]} \Rightarrow y=[0,2]$ ج) $y=\sqrt{\underbrace{x^7-3x^2+4x+1}_{R\text{ چندجمله‌ای درجه فرد}}} \Rightarrow \sqrt{\mathbb{R}}=[0,+\infty)=R_y$ د) $\log(\underbrace{x^3-6x^2+7x+4}_{\mathbb{R}}) \Rightarrow \log^{(0,+\infty)}=(-\infty,+\infty)=\mathbb{R}$	۲
الف) $y=\frac{3x+1}{2x-6}=\frac{3\infty+1}{2\infty+1} \quad R_y=\mathbb{R}-\{\frac{3}{2}\}$ ب) $y=\sqrt{\frac{4x+1}{x-2}} \quad R_{\frac{4x+1}{x-2}}=\mathbb{R}-\{4\} \quad R_y=\sqrt{\mathbb{R}-\{4\}}=[0,+\infty)-\{2\}$ ج) $y=\frac{x^2+4}{\sqrt{x^2+3}} \quad y=\frac{x^2+3}{\sqrt{x^2+3}}+\frac{1}{\sqrt{x^2+3}}=\sqrt{x^2+3}+\frac{1}{\sqrt{x^2+3}} \quad R_y=[\sqrt{3}+\frac{1}{\sqrt{3}},+\infty)$ $x_{min}=0 \Rightarrow \sqrt{3}+\frac{1}{\sqrt{3}}$ د) $y=x^2+\frac{1}{x^2+4} \Rightarrow y=x^2+4+\frac{1}{x^2+4}-4 \quad R_y=[\frac{1}{4},+\infty)$ $x=0 \Rightarrow 4+\frac{1}{4}=4{,}25-4=0{,}25$	۳
روش اصلی $y=\frac{3x^2+4}{x^2-1}$ $yx^2-y=3x^2+4=(y-3)x^2-y-4=0$ $y\neq 3$ $\Rightarrow\Delta\geq 0 \Rightarrow 0-4(y-3)(-y-4)\geq 0 \overset{I}{\Rightarrow} \boxed{y\in(-\infty,4]\cup(3,+\infty)}$ $I\cup II \Rightarrow$ $y=3 \quad \cancel{3x^2}-3=\cancel{3x^2}+4$ غ ق ق $\overset{II}{\Rightarrow} y\neq 3$ $y=\frac{3x^2+4}{x^2-1}$ ریشه دارد $x=\infty$ $x=0 \Rightarrow$ $y=\frac{4}{-1}=-4 \quad y=\frac{3\infty^2}{\infty^2}=3$ $\Rightarrow y\in(-\infty,-4]\cup(3,+\infty)$	۴
$y=\frac{2\sin x-1}{\sin x+3} \Rightarrow \sin x=-\frac{3y+1}{y-2}=\frac{3y+1}{2-y}$ روش اصلی $-1\leq\frac{3y+1}{2-y}\leq 1 \Rightarrow 2\leq\frac{7}{2-y}\leq 4$ $\Rightarrow\frac{1}{4}\leq\frac{2-y}{7}\leq\frac{1}{2} \Rightarrow \frac{7}{4}\leq 2-y\leq\frac{7}{2} \Rightarrow -\frac{1}{4}\geq -y\geq\frac{3}{2}$ $y\in[-\frac{3}{2},\frac{1}{4}] \quad \frac{1}{4}\geq y\geq -\frac{3}{2}$ تذکر ۲: $y=\frac{2\sin x-1}{\sin x+3}$ صفر نمی‌شود $y=\frac{2(1)-1}{1+3}=\frac{1}{4} \quad y=\frac{-3}{-1+3}=-\frac{3}{2}$ $y\in[-\frac{3}{2},\frac{1}{4}]$	۵

$f(x)=\frac{x^2-x+\frac{1}{4}}{x^2-x+1}=y$ $\qquad x^2-x+1\neq 0 \quad \Delta<0 \Rightarrow \boxed{D_f=\mathbb{R}}$ ۶

I $\quad y\neq 1 \qquad (y-1)^2-4(y-1)(y-\frac{1}{4})\geq 0$

$yx^2-xy+y=x^2-x+\frac{1}{4}$ $\qquad y^2-2y+\cancel{1}-4y^2+5y-\cancel{1}\geq 0$

$(y-1)x^2-x(y-1)+y-\frac{1}{4}=0$ $\qquad -3y^2+3y\geq 0 \Rightarrow y^2-y\leq 0$

$+ \quad 0 \quad - \quad 1 \quad +$

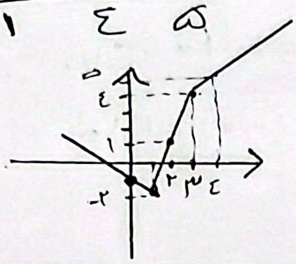
$y=1 \quad \cancel{x^2-x}+1=\cancel{x^2-x}+\frac{1}{4}$ غ ق II

$\frac{I}{II} \quad \boxed{y\in[0,1)}$

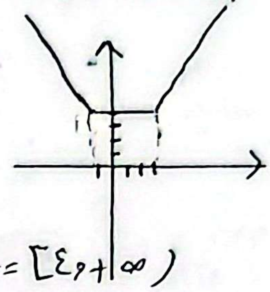
الف) $y=|2x-2|-|x-3|$ ۷

x	0	1	2	3	4
y	-1	-2	1	4	5

$R_f=[-2,+\infty)$



ب) $y=|x-3|+|x+1|$

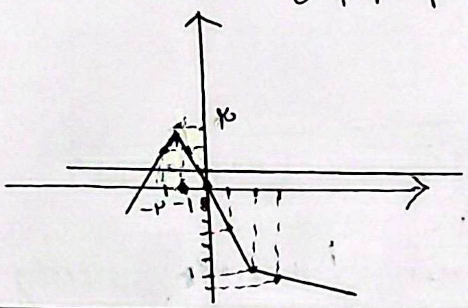


$R_f=[4,+\infty)$

$|x-2|-|2x+2|\leq 1$ ۸

x	-2	-1	0	1	2	3
y	2	3	0	-3	-6	-7

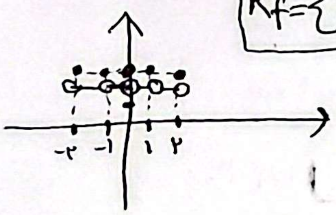
$x\in(-\infty,-3]\cup[-\frac{1}{3},+\infty)$



الف) $y=[x]+[3-x] \qquad [-2,2]$ ۹

$y=[x]+[-x]+3$

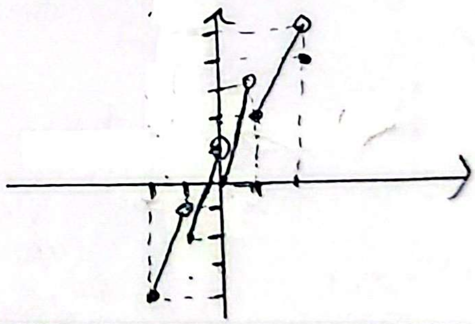
$\boxed{R_f=\{2,3\}}$



ب) $y=3x-[x] \qquad [-2,2]$

$\begin{cases} 3x+2 & -2\leq x<-1 \\ 3x+1 & -1\leq x<0 \\ 3x & 0\leq x<1 \\ 3x-1 & 1\leq x<2 \\ 4 & x=2 \end{cases}$

$R_f=[-4,5)$



الف) $y=\sin^2x-\sin x+1$ $\quad \sin x=1 \quad y=1-1+1=1$

$\sin x=-1 \quad y=1+1+1=3$

$\sin x=-\frac{b}{2a}=\frac{1}{2} \quad y=\frac{1}{4}-\frac{1}{2}+1=\frac{3}{4}$

$R_f=[\frac{3}{4},3]$

ب) $y=\sin^4x+\sin^2x+1$ ۱۰

$\sin^2x=1 \qquad y=3$

$\sin^2x=0 \qquad y=1$

غ ق $\sin^2x=-\frac{1}{2}$

$R_f=[1,3]$

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