«به نام خدا»

نام و نام خانوادگی: مجتبی محمدیان　　کلاس: B　　پایه: دهم

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الف) $y=\frac{x+4}{4x^3-20x^2+31x-15}$

$4x^3-20x^2+31x-15 \div (x-1) = 4x^2-16x+15$

$4x^2-16x+15=(2x-3)(2x-5)$　$x=\frac{3}{2}$　$x=\frac{5}{2}$

جمع ضرایب برابر صفر است بنابراین ⇐　$D_f=\mathbb{R}-\{1,\frac{3}{2},\frac{5}{2}\}$

ب) $y=\frac{x+3}{3x^3-x^2-8x-4}$

$3x^3-x^2-8x-4 \div (x+1) = 3x^2-4x-4$

$3x^2-4x-4 \Rightarrow x^2-4x-12$　$(x-6)(x+2)$　$x=2$　$x=-\frac{2}{3}$

جمع ضرایب زوج و فرد برابر است بنابراین ⇐　$D_f=\mathbb{R}-\{-1,2,-\frac{2}{3}\}$

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ب) $y=\frac{x+2}{x-\sqrt{3x-2}}$

$3x-2\geq 0$　$3x\geq 2$　$x\geq \frac{2}{3}$

$x-\sqrt{3x-2}\neq 0$　$x\neq\sqrt{3x-2}$　$x^2-3x+2\neq 0$　$(x-1)(x-2)$　$x=1$ و 2

$x\geq\frac{2}{3}$　$x\neq 1$　$x\neq 2$　$D_f=[\frac{2}{3},+\infty)-\{1,2\}$

الف) $y=\frac{x+1}{x-\sqrt{3-2x}}$

$3-2x\geq 0$　$-2x\geq -3$　$2x\leq 3$　$x\leq\frac{3}{2}$　$(-\infty,\frac{3}{2}]-\{1\}=D_f$

$x-\sqrt{3-2x}\neq 0$　$(x\neq\sqrt{3-2x})^2 \Rightarrow x^2-3+2x \Rightarrow (x-1)(x-2)$　$x\neq 2$　$x\neq 1$

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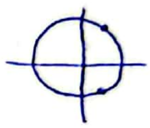
الف) $\frac{\sin x}{2\cos x-1}$

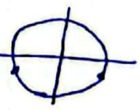
$2\cos x-1\neq 0$　$2\cos x\neq 1$　$\cos x\neq\frac{1}{2}$　$\cos x\neq\frac{\pi}{3}, \frac{5\pi}{3}$



$D_f=\mathbb{R}-\{2k\pi+\frac{\pi}{3}, 2k\pi+\frac{5\pi}{3}\}$

ب) $y=\frac{\cos x+1}{2\sin x+1}$

$2\sin x+1\neq 0$　$2\sin x\neq -1$　$\sin x\neq -\frac{1}{2}$　$\sin x\neq\frac{11\pi}{6},\frac{7\pi}{6}$



$D_f=\mathbb{R}-\{2k\pi+\frac{7\pi}{6}, 2k\pi+\frac{11\pi}{6}\}$

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الف) $x^2-5x+6>0$　$(x-2)(x-3)>0$　+ 2 − 3 +

$D_f=(3,+\infty)\cup(-\infty,2)$

ب) $x^2-6x+5<0 \Rightarrow (x-1)(x-5)<0$　+ 1 − 5 +　$D_f=(1,5)$

ج) $x^2+6x+5\geq 0$　$(x+1)(x+5)\geq 0$　+ −5 − −1 +　$D_f=[-1,+\infty)\cup(-\infty,-5]$

د) $x^2-7x+6\leq 0$　$(x-1)(x-6)\leq 0$　+ 1 − 6 +　$D_f=[1,6]$

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الف) $\frac{x^2-3x+2}{x-5}<0$　$\frac{(x-1)(x-2)}{(x-5)}$　− 1 + 2 − 5 +　$D_f=(-\infty,1)\cup(2,5)$

ب) $\frac{x^2-1}{x^2-6x+5}\geq 0$　$\frac{(x-1)(x+1)}{(x-1)(x-5)}\geq 0$

+ −1 − 1 (ن.ت) − 5 (ن.ت) +　≥ 0

$D_f=(5,+\infty)\cup(-\infty,-1]$

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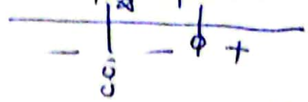
الف) $y=\sqrt{\dfrac{x^2-4x+3}{x^3-1}} \Rightarrow \dfrac{(x-1)(x-3)}{(x-1)(x^2+x+1)} \geq 0$

$\Delta = b^2-4ac=-3$

جواب ندارد پس این عبارت همواره + است



$D_f=[3,+\infty)$

ب) $y=\sqrt[3]{\dfrac{x^2-4x+3}{x^2-1}} \Rightarrow x^2-1\neq 0 \quad x\neq 1,-1$

$D_f=\mathbb{R}-\{1,-1\}$

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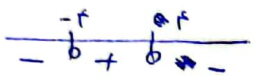
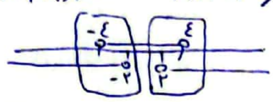
الف) $y=\log(x^2-3x) \quad x^2-3x>0 \quad x(x-3)>0$

$D_f=(3,+\infty)\cup(-\infty,0)$

ب) $y=\log_{|x|-2} 16-x^2 \quad 16-x^2>0 \quad (4-x)(4+x)>0 \quad |x|-2>0 \quad |x|>2 \quad x>2 \quad x<-2$

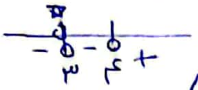




$x\neq 3,-3$

$D_f=(2,4)\cup(-4,-2)-\{3,-3\}$

ج) $y=\log_{10-x} \dfrac{x^2-7x+12}{x-3} \quad \dfrac{(x-3)(x-4)}{(x-3)}>0$



$D_f=(4,10)-\{9\}$

$10-x>0 \quad -x>-10 \quad x<10 \quad x\neq 9$

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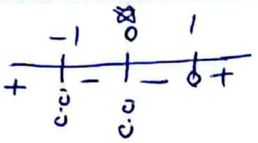
روش سریع

$y=\dfrac{x^2-x}{x^2+x} \quad \dfrac{x(x-1)}{x^2+x}$



روش دوم

x		-1		0		1	
x^2-x	+		+	0	−	0	+
x^2+x	+	0	−	0	+		+
P	+	ن.ت	−	ن.ت	−	0	+

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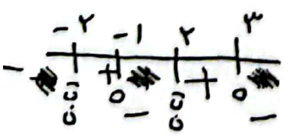
$y=\sqrt{\dfrac{x-f(x)}{f(x)}} \quad f(x)\neq 0 \quad \dfrac{x-f(x)}{f(x)}\geq 0$

$x-f(x)=0 \quad x=f(x) \quad x=3,-1$

علامت در این بازه $\pm$ $(-1,3)$

$f(x)\neq 0 \quad x=2,-2$



$D_f=(-2,-1]\cup[2,3)$

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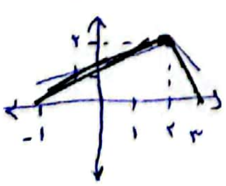
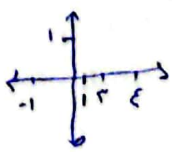
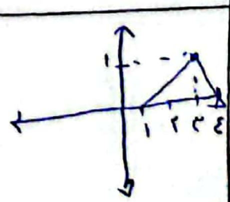
الف) $f(x)+1$

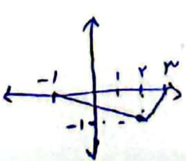


ب) $f(x-1)$

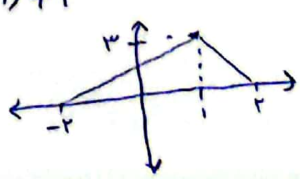




ج) $-f(x)$



د) $f(x+1)+2$

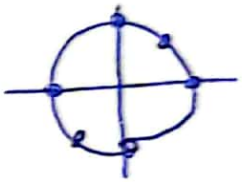


ادامه سوال ۳

ج) $y=\frac{\tan x+2}{\cot x-1}$ $\quad \cot x-1\neq 0 \quad \cot x\neq 1 \quad \cot x\neq \frac{\pi}{4}$ و $\frac{5\pi}{4}$

$\cot=\frac{\cos}{\sin}$ $\quad \cos\neq 0 \quad \cos\neq \frac{\pi}{2}, \frac{3\pi}{2}$

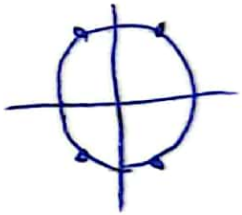
$\tan=\frac{\sin}{\cos}$ $\quad \sin\neq 0 \quad \sin\neq 0, \pi$



$$D_f=R-\{k\pi\}\cup\{k\pi+\frac{\pi}{4}\}\cup\{k\pi+\frac{\pi}{2}\}$$

د) $y=\frac{\sin x+1}{4\sin^2 x-3}$ $\quad 4\sin^2 x-3\neq 0$

$4\sin^2 x\neq 3 \quad \sin^2 x\neq \frac{3}{4} \quad \sin x\neq \pm\sqrt{\frac{3}{4}}$

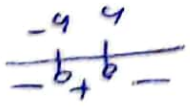


$$D_f=R-\{k\pi\pm\frac{\pi}{3}\}$$

ادامه سوال ۷

ه) $y=\sqrt{x^2-11x+28}+\log_x^{\sqrt{25-x^2}}$ $\quad x^2-11x+28\geq 0 \quad (x-4)(x-7)\geq 0 \quad x>0 \quad x\neq 1$

$\sqrt{(5-x)(5+x)}>0$



$$D_f=(0,5]-\{1\}$$