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سارینا حاجی‌یاری دهم ریاضی G به نام خدا

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

$4 + 31 - 20 - 15 = 0$ بخش‌پذیر بر $x-1$

$D_f = \mathbb{R} - \{1, 2/5, 1/5\}$

$4x^3 - 20x^2 + 31x - 15 \;\big|\; x-1$

$-4x^3 + 4x^2 \qquad\qquad 4x^2 - 16x + 15$

$-16x^2 + 31x - 15$

$+16x^2 - 16x$

$15x - 15$

$-15x + 15$

0

$4x^2 - 16x + 15$

$\Delta = 256 - 4 \times 4 \times 15 = 16$

$x = \dfrac{16 \pm \sqrt{16}}{8}$

$\dfrac{16+4}{8} = 2/5 \qquad \dfrac{16-4}{8} = 1/5$

ب) $y = \dfrac{x+3}{3x^3 - x^2 - 8x - 4}$

$3 - 8 \bigcirc -1 - 4$

$-5 = -5$ بخش‌پذیر بر $(x+1)$

$D_f = \mathbb{R} - \{-1, 2, -\frac{2}{3}\}$

$3x^3 - x^2 - 8x - 4 \;\big|\; x+1$

$-3x^3 - 3x^2 \qquad\qquad 3x^2 - 4x - 4$

$-4x^2 - 8x - 4$

$+4x^2 + 4x$

$-4x - 4$

$+4x + 4$

0

$3x^2 - 4x - 4$

$x^2 - 4x - 12$

$(x-6)(x+2)$

$\dfrac{-2}{3} \qquad \dfrac{6}{3} = 2$

۲) الف) $y = \dfrac{x+1}{x - \sqrt{3-2x}}$

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$0 \leq 3 - 2x \qquad 2x \leq 3 \qquad x \leq \frac{3}{2} \qquad x \leq 1/5$

$x - \sqrt{3-2x} \neq 0$

$\mathbb{R} = (-\infty, 1/5] - \{1, -3\}$

$x \neq \sqrt{3-2x}$

$x^2 \neq 3 - 2x$

$x^2 + 2x - 3 \neq 0$

$(x-1)(x+3) \neq 0$

$\downarrow \qquad \downarrow$

$1 \qquad -3$

۲) ب) $y = \frac{x+2}{x-\sqrt{3x-2}}$

$3x-2 \geq 0 \quad 3x \geq 1 \quad x \geq \frac{2}{3}$

$x - \sqrt{3x-2} \neq 0$

$x \neq \sqrt{3x-2}$

$x^2 \neq 3x-2$

$x^2-3x+2 \neq 0$

$(x-1)(x-2) \neq 0$

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

۳)

الف) $y = \frac{\sin x}{2\cos x - 1}$

$2\cos x - 1 \neq 0$

$2\cos x \neq 1$

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

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

ب) $y = \frac{\cos x + 1}{2\sin x + 1}$

$2\sin x + 1 \neq 0$

$2\sin x \neq -1$

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

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

ج) $y = \frac{\tan x + 2}{\cot x - 1}$

$\sin \neq 0$

$\cos \neq 0 \quad \frac{\cos x}{\sin x} - 1 \neq 0 \quad D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}, \frac{k\pi}{2}\}$

$\frac{\cos}{\sin} \neq 1$

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

$4\sin^2 x - 3 \neq 0$

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

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

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سارینا ذوالفقاری

۴) الف) $x^2-5x+6>0$

$(x-2)(x-3)>0$

	2		3	
+	0	−	0	+

جواب = $(-\infty,2)\cup(3,+\infty)$

$x>3$
$x<2$

ب) $x^2-6x+5<0$

$(x-1)(x-5)<0$

	1		5	
+	0	−	0	+

$1<x<5$ جواب = $(1,5)$

ج) $x^2+6x+5\geq 0$

$(x+1)(x+5)\geq 0$

	−5		−1	
+	0	−	0	+

جواب = $(-\infty,-5]\cup[-1,+\infty)$

$x\leq -5$
$x\geq -1$

د) $x^2-7x+6\leq 0$

$(x-1)(x-6)\leq 0$

	1		6	
+	0	−	0	+

جواب $[1,6]$

$1\leq x\leq 6$

۵) الف) $\frac{x^2-3x+2}{x-5}<0$, $(x-1)(x-2)$

	1		2		5	
−	0	+	0	−	ن	+

جواب = $(-\infty,1)\cup(2,5)$

$x<1$
$2<x<5$

ب) $\frac{x^2-1}{x^2-6x+5}\geq 0$

$\frac{(x+1)(x-1)}{(x-1)(x-5)}$

	−1		1		5	
+	0	−	ن	−	ن	+

جواب = $(-\infty,-1]\cup(5,+\infty)$

صادرتا نفر اول

۴) الف) $y=\sqrt{\dfrac{x^2-4x+3}{x^3-1}}$

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$x \neq 1$

$y=\sqrt{\dfrac{(x-1)(x-3)}{(x-1)(x^2+x+1)}}$ $D_f=[3,+\infty)$

$\Delta = 1-4\times1\times1$ منفی (ریشه ندارد)

$\overset{*}{1}$ 3

$-$ | $-$ | $+$

ب) $y=\sqrt[3]{\dfrac{x^2-4x+3}{x^2-1}}$ $D_f=\mathbb{R}-\{1,-1\}$

۷) الف) $y=\log(x^2-3x)$

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

$0<x^2-3x$

$0<x(x-3)$

0 3

$+$ | $-$ | $+$

ب) $y=\log_{|x|-2}(16-x^2)$

$|x|-2\neq1$ $x\neq\pm3$ $0<16-x^2$

$0<|x|-2$ $x^2<16$ $D_f=(-4,-2)\cup(2,4)-\{3,-3\}$

$2<|x|$ $\begin{cases}2<x\\ x<-2\end{cases}$ $-4<x<+4$

ج) $y=\log_{10-x}\dfrac{x^2-7x+12}{x-3}$

$\dfrac{(x-3)(x-4)}{x-3}$ $\overset{*}{3}$ 4 $\rightarrow 4<x$ $D_f=(4,10)-\{9\}$

$-$ | $-$ | $+$

$10-x\neq1$ $x\neq9$

$0<10-x$

$x<10$

۷) $y = \sqrt{x^2 - 11x + 28} + \log_x \sqrt{24 - x^2}$

$(x-4)(x-7)$

	4		7	
	+	−		+

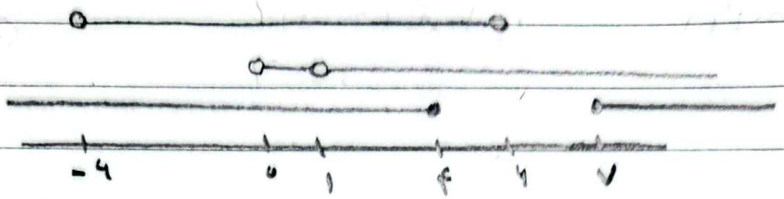
$x \le 4 \quad x \ge 7$

$0 < x \quad x \neq 1$

$0 < 24 - x^2$

$x^2 < 24$

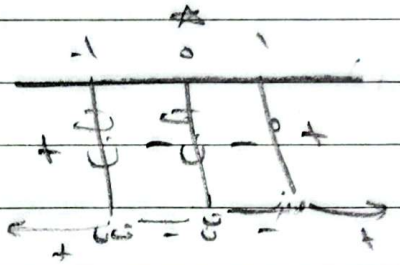
$-4 < x < 4$



$D_f = (0, 4] - \{1\}$

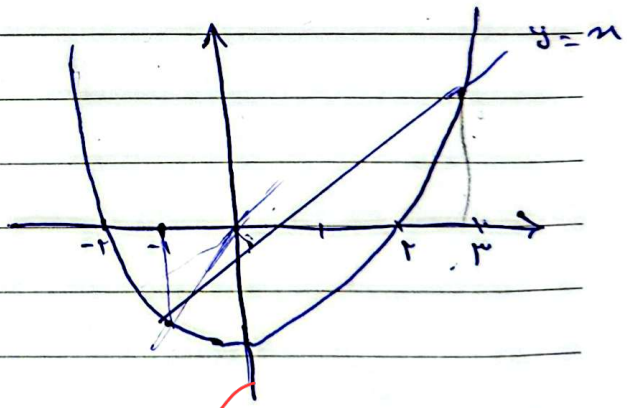
۸) $y = \dfrac{x^2 - x}{x^2 + x - 1}$

		0		1	
$x(x-1)$	+	+	−	−	+
$x(x+1)$	+	−	−	+	+
$p(x)$	+	−	+	−	+



۹) $y = \sqrt{\dfrac{x - f(x)}{f(x)}}$

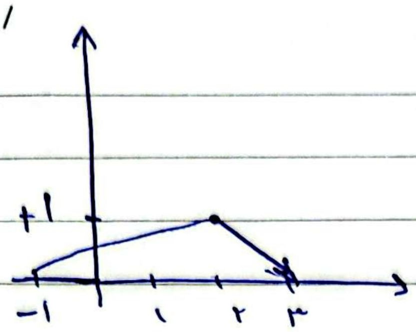
		-2		-1		2		3	
$x - f(x)$	−		−	0	+		−	0	−
$f(x)$	+	0	−		−	0	+		+
	−	+		−		−		−	



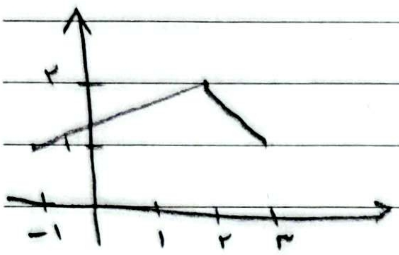
$D_f = (-2, -1) \cup \{3\}$

ساریا ضیایی

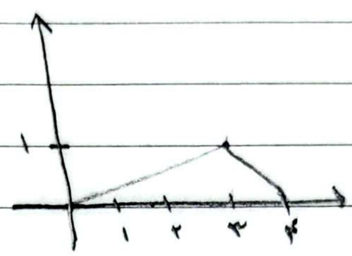
۱۵)



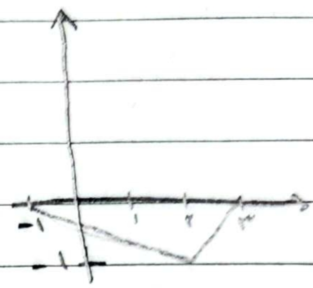
الف) $f(x)+1$



ب) $f(x-1)$



ج) $-f(x)$



د) $f(x+1)+2$