آرشیا درستکار

صفحه تمرین ۱

۶. الف) $\frac{x+4}{4x^3-20x^2+31x-15} =$ $\quad D_f = R - \{1\}$

$(x+1)(4x^2-16x+15)$

$4x^3-20x^2+31x-15 \mid x-1$

$4x^2-16x+15$

صفحه تمرین ۲

الف) $\frac{x+3}{3x^3-x^2-8x-4} =$

$3x^3-x^2-8x-4 \rightarrow (x+1)(3x^2-4x-4) \quad D_f = R - \{-1\}$

$3x^3-x^2-8x-4 \mid x+1$

$3x^2-4x-4$

ج. الف) $y = \frac{x+1}{x-\sqrt{3-2x}} =$

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

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

$x^2 \neq 3-2x$

$x^2+2x \neq 3$

$x(x+2) \neq 3$

$x \neq 1$

$3-2x \geq 0$

$2x \leq 3$

$x \leq \frac{3}{2}$

$D_f = (-\infty, \frac{3}{2}] - \{1\}$

ب) $\frac{x+2}{x-\sqrt{3x-2}} =$

$3x-2 \geq 0$

$3x \geq 2 \quad x \geq \frac{2}{3}$

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

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

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

$x^2 \neq 3x-2$

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

$x(x-3) \neq -2$

$x \neq 1$

$3x-2 \geq 0 \quad 3x \geq 2$

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

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۳. الف) $y = \frac{\sin x}{2\cos x-1}$

$2\cos x-1 \neq 0$

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

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

ب) $y = \frac{\cos x+1}{2\sin x+1}$

$2\sin x+1 \neq 0 \quad \sin x \neq -\frac{1}{2}$

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

ج) $y = \frac{\tan x+1}{\cot x-1}$

$\cot\theta = \frac{\cos\theta}{\sin\theta} \quad \tan = \frac{\sin\theta}{\cos\theta}$

$\cot x-1 \neq 0$

$\frac{\cos x}{\sin x} \neq 1 \quad 2k\pi+\frac{\pi}{4}, 2k\pi+\frac{5\pi}{4} \quad k\pi-\frac{\pi}{2}$

$\sin x \neq 0$

$\cos x \neq 0 \quad 2k\pi-$

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

6.

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

① * مضاعف (یکبار)

		1		3	
	+	∅	−	0	−

$(-\infty,1)\cup[3,+\infty)$

ب) $\sqrt[3]{\frac{x^2-4x+3}{x^2-1}}$

$x^2-1\neq 0$

$x^2\neq 1$

$x\neq \pm 1 \qquad D_f=\mathbb{R}-\{\pm 1\}$

7.

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

$x(x-3)>0$ ⓪ ③

		0		3	
	+	0	−	0	+

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

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

$|x|-2>0 \qquad |x|-2\neq 1 \qquad |x|\neq 3$

$|x|>3 \qquad x>2 \qquad x<-2 \qquad x\neq\pm 3$

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

ج) $y=\log_{10-x}\frac{x^2-7x+12}{x-3}$ $\qquad (x-4)(x-3)$ ④ ③

$\frac{x^2-7x+12}{x-3}>0$ ③

		3 *		4	
	+	∅	−	0	+

$10-x>0$

$10-x\neq 1 \qquad x\neq 9 \qquad (-\infty,3)\cup(4,+\infty)$

$-x>-10 \qquad x<10 \qquad (-\infty,10)$

$D_f=(-\infty,3)\cup(4,+\infty)\cup$ $(-\infty,10)-\{9\}$

د) $\sqrt{x^2-11x+28}+\log_x\sqrt{36-x^2}$ $\qquad x^2-11x+28\geq 0$

$(x-4)(x-7)$ ④ ⑦

		4		7	
	+	0	−	0	+

$(-\infty,4]\cup[7,+\infty)$

$\sqrt{36-x^2}>0 \qquad 36>x^2 \qquad x>-6 \qquad x<6$

$x>0 \qquad x\neq 1$

$D_f=(-\infty,4]\cup[7,+\infty)\cup(-6,+\infty)\cup(-\infty,6)-\{1\}$

8.

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

$x(x+1)$ ⓪ ⊖1

		−1		0		1	
x^2-x	+		+	0	−	0	+
x^2+x	+	0	−	0	+		+
$P(x)$	+	∅	−	∅	−	0	+

		−1		0 *		1	
	+	∅	−	∅	−	0	+

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

د) $\frac{\sin x+1}{4\sin^2 x-3}$

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

$4\sin^2 x\neq 3$

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

$\sin x\neq \frac{\sqrt{3}}{2}$

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

۴.

الف) $x^2-5x+6>0$

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

(۲) (۳)

x		2		3	
	+	0	−	0	+

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

۲و۳ ×

ب) $x^2-6x+5>0$

$(x-5)(x-1)\leq 0$

(۵) (۱)

x		1		5	
	+	0	−	0	+

$D_f=[1,5]$

۱و۵ ×

ج) $x^2+5x+6\geq 0$

$(x+2)(x+3)\geq 0$

(−۲) −۳

x		−3		−2	
	+	0	−	0	+

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

د) $x^2-7x+6\leq 0$

$(x-1)(x-6)$

(۱) (۶)

x		1		6	
	+	0	−	0	+

$D_f=[1,6]$

۵.

الف) $\frac{x^2-3x+2}{x-5}<0$

$(x-2)(x-1)$

(۵)

x		1		2		5	
	−	0	+	0	−		+

$D_f=(-\infty,1)\cup(2,5)$

توان زوج ⇐ مضاعف

ب) $\frac{x^2-1}{x^2-6x+5}\geq 0$

(+۱) (−۱)

$(x-1)(x-5)$

(۱) (۵)

x		−1		1		5	
	−	0	+		−		+

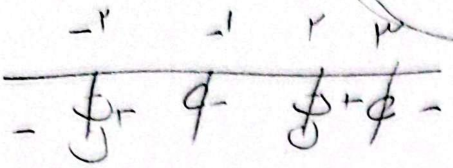
$[-1,1)\cup(5,+\infty)$

۹.

$\frac{x - f(x)}{f(x)} \geq 0 \qquad f(x) \neq 0$

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

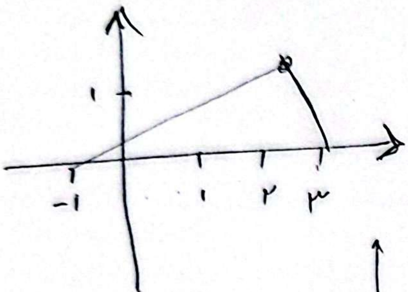
$x \neq \pm 2$

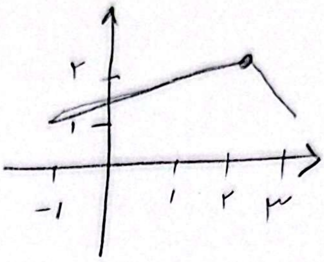


$D_f = (-2, 1] \cup (2, 3]$

۱۰.

الف)





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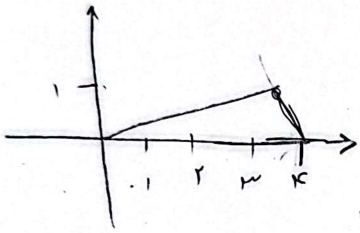

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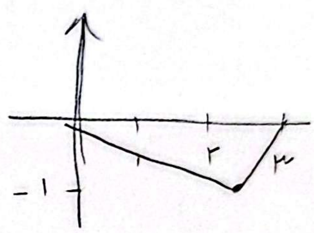

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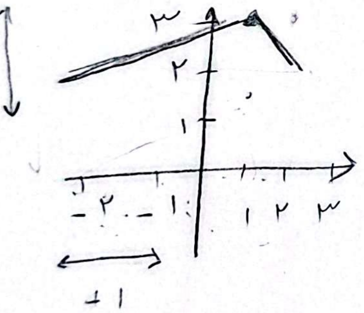

آرشیدا درویش