نام: ماهان داودی / ... / پنجشنبه / تکلیف صفحه ۶.

۱)

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

$$\begin{array}{l|l} 4x^3-20x^2+31x-15 & x-1 \\ \underline{-4x^3+4x^2} & \overline{4x^2-16x+15} \\ -16x^2+31x-15 & \\ \underline{+16x^2-16x} & \\ 15x-15 & \\ \underline{-15x+15} & \\ 0 & \end{array}$$

$$\frac{x+4}{\underbrace{(x-1)}_{1}\underbrace{(2x-3)}_{x=\frac{3}{2}}\underbrace{(2x-5)}_{x=\frac{5}{2}}}$$

$(2x-3)(2x-5)(x-1)$ — $x=1$

$D_f=\mathbb{R}-\{1,\frac{3}{2},\frac{5}{2}\}$

ب) $y=\dfrac{x+3}{3x^3-x^2-8x-4}$

$$\begin{array}{l|l} 3x^3-x^2-8x-4 & x+1 \\ \underline{-3x^3-3x^2} & \overline{3x^2-4x-4} \\ -4x^2-8x-4 & \\ \underline{+4x^2+4x} & \\ -4x-4 & \\ \underline{+4x+4} & \\ 0 & \end{array}$$

$3x^2-4x-4=$

$x^2-4x-12=$

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

ریشه: $x=+\frac{6}{3}=\frac{1}{2}$ / $x=-\frac{2}{3}$

$$\frac{x+3}{\underbrace{(x+1)}_{-1}\underbrace{(x-\frac{6}{3})}_{+\frac{6}{3}=\frac{1}{2}}\underbrace{(x+\frac{2}{3})}_{-\frac{2}{3}}}$$

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

۲)

الف) $y=\dfrac{x+1}{x-\sqrt{3-2x}}$ ⇒ $3-2x\geq 0$ ⇒ $2x\leq 3$, $x\leq\frac{3}{2}$ (1)

$x-\sqrt{3-2x}\neq 0$ ⇒ $(x\neq\sqrt{3-2x})^2$ ⇒

$x^2\neq 3-2x$ ⇒ $x^2-3+2x\neq 0$

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

$+1$ ، -3 زائد

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

ب) $y=\dfrac{x+2}{x-\sqrt{3x-2}}$ ⇒ $3x-2\geq 0$ $3x\geq 2$

$x\geq\frac{2}{3}$ (1)

$x-\sqrt{3x-2}\neq 0$ ⇒ $(x\neq\sqrt{3x-2})^2$ ⇒

$x^2\neq 3x-2$ ⇒ $x^2-3x+2\neq 0$ ⇒ $\underbrace{(x-2)}_{x=2}\underbrace{(x-1)}_{x=1}$

هر دو صادق ← $+1$ / 2

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

۳)

$y=\dfrac{\sin x}{2\cos x-1}$ ⇒

$2\cos x-1\neq 0$

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

$x\neq 60^\circ ; 300^\circ$

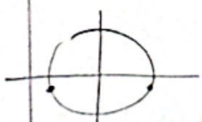
$D_f=\mathbb{R}-\{2k\pi+\frac{\pi}{3}, 2k\pi-\frac{\pi}{3}\}$

$\dfrac{\cos x-1}{2\sin x+1}$ ⇒

$2\sin x+1\neq 0$

$\sin x\neq -\frac{1}{2}$ ⇒ $x\neq 210, 330$

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

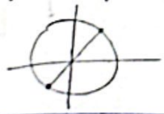


$y=\dfrac{\tan x+2}{\cot x-1}$ ⇒

$\cot x-1\neq 0$

$\cot x\neq 1$ $x\neq 45, 225$

$D_f=\mathbb{R}-\{k\pi-\frac{\pi}{4}\}$



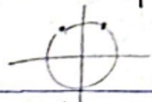
$y=\dfrac{\sin x+1}{4\sin^2 x-3}$ ⇒

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

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

$\sin x\neq\frac{\sqrt{3}}{2}$ $x\neq 60^\circ, 120^\circ$

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



۴)

$x^2-5x+6>0$

$\underbrace{(x-3)}_{+3}\underbrace{(x-2)}_{+2}>0$

$+2$ $+3$

$+\;|\;-\;|\;+$

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

$x^2-6x+5<0$

$\underbrace{(x-5)}_{+5}\underbrace{(x-1)}_{+1}<0$

$+1$ $+5$

$+\;|\;-\;|\;+$

$(+1,+5)$

$x^2+6x+5\geq 0$

$\underbrace{(x+5)}_{-5}\underbrace{(x+1)}_{-1}\geq 0$

-1 -5

$+\;|\;-\;|\;+$

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

$x^2-7x+6\leq 0$

$\underbrace{(x-6)}_{+6}\underbrace{(x-1)}_{+1}\leq 0$

$+1$ $+6$

$+\;|\;-\;|\;+$ $[+1,+6]$

۵)

$\dfrac{x^2-3x+2}{x-5}>0$ ⇒ $\dfrac{\overbrace{(x-2)}^{2}\overbrace{(x-1)}^{1}}{(x-5)}>0$

1 2 5 5

$-\;|\;+\;|\;-\;|\;+$

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

$\dfrac{x^2-1}{x^2-6x+5}\geq 0$ $\dfrac{\overbrace{(x+1)}^{-1}\overbrace{(x-1)}^{+1}}{\underbrace{(x-5)}_{+5}\underbrace{(x-1)}_{+1}}\geq 0$

حذف

-1 $+1$ 5

$+\;|\;-\;|\;-\;|\;+$ ⇒ $(-\infty,-1]\cup(5,+\infty)$

$y=\frac{x^2-4x+3}{x^2-1} \Rightarrow \frac{x^2-4x+3}{x^2-1} \Rightarrow$

$x^2-1\neq 0 \Rightarrow \underbrace{(x+1)}_{-1}\underbrace{(x-1)}_{+1}\neq 0$

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

$y=\sqrt{\frac{x^2-4x+3}{x^2-1}} \Rightarrow \sqrt{\frac{(x-3)(x-1)}{x^2-1}} \Rightarrow x\neq 1$ (1) 6

$\frac{\underbrace{(x-3)}_{+3}\underbrace{(x-1)}_{+1}}{x^2-1}\geq 0 \Rightarrow$

تعریف نشده $+1$, $+3$: $-\ \circ\ -\ |\ +$

$D_f=[+3,+\infty)$

$\sqrt{x^2-11x+28}+\log_x\sqrt{36-x^2}$ 7

$\underbrace{(x-7)}_{7}\underbrace{(x-4)}_{4}\geq 0$ — 4, 7: $+\ |\ -\ |\ +$

$\sqrt{36-x^2}\geq 0$ $\underbrace{(6-x)}_{6}\underbrace{(6+x)}_{-6}\geq 0$ — -6, $+6$: $-\ |\ +\ |\ -$

$x>0$ $x\neq 1$

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

$\log_{10-x}\frac{x^2-7x+12}{x-2} \Rightarrow \frac{x^2-7x+12}{x-2}>0$

$\frac{(x-3)(x-4)}{x-2}>0$ — 3^*, 4: $-\ \circ\ -\ |\ +$

$(4,+\infty)$ (1)

$10-x>0 \Rightarrow \begin{matrix}x<10\\ x\neq 9\end{matrix}$ (2)

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

$y=\log_{|x|-2}(16-x^2)$

$16-x^2>0$ $(4-x)(4+x)>0$ — -4, 4: $-\ |\ +\ |\ -$ $(-4,4)$

$|x|-2>0$ $|x|>2$ $x<-2$ $x>2$ $x\neq -3,3$

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

$y=\log(x^2-3x)$

$x^2-3x>0$

$x(x-3)>0$

0, $+3$: $+\ |\ -\ |\ +$

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

$y=\frac{x^2-x}{x^2+x} \Rightarrow x^2-x \Rightarrow \underset{0}{x}\underset{1}{(x-1)}$ 8

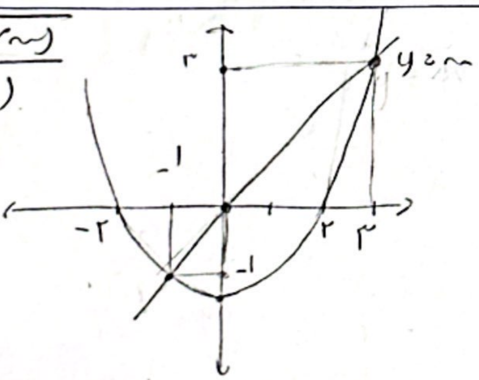
$\Rightarrow x^2+x=\underset{0}{x}\underset{-1}{(x+1)}$

-1 تعریف نشده 0^* $+1$

$+\ \circ\ -\ \circ\ -\ |\ +$

	-1	0	$+1$	
x^2-x	$+$	$+$	$-$	$+$
x^2+x	$+$	$-$	$+$	$+$
$f(x)$	$+$	$-$	$-$	$+$

$y=\sqrt{\frac{x\cdot f(x)}{f(x)}}$ 9

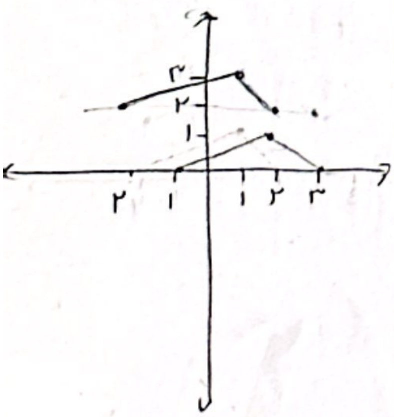


ریشه: $-2,2$

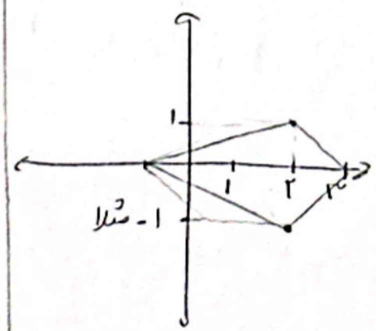
-2, 2: $+\ |\ -\ |\ +$

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

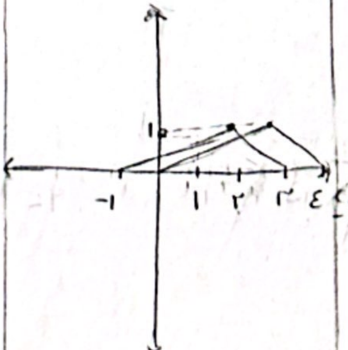
$f(x+1)+2$ 10



$-f(x)$



$f(x-1)$



$f(x)+1$