(۱)

$x^2+y^2-4x+4y+k=0$

$k=?$ $\quad x^2-4x+k_1 \Rightarrow k_1=4$ $\quad y^2+4y+k_2 \Rightarrow k_1+k_2=11 \leftarrow$ باقیمانده

$(\sqrt{2}x-\sqrt{2})^2$ $\quad (y+3)^2 \Rightarrow k_2=9$

$2x^2-4x+2$ $\quad y^2+4y+9$ ✓ (۵)

(۲)

$f(x)=\begin{cases} x^2+4x & ; x \geq a \\ 2x+a+2 & ; x \leq a \end{cases}$ $\quad f(1)=?$ $\quad a>0$ شرط ذکر شده

$x \geq 1 \leftarrow$ $\quad x^2+4 \quad 1+4=5$ ✓ (۵)

$2x+a+2$ $\quad x \leq 1$

$a \xrightarrow{①} a^2+4a=3a+2 \rightarrow a^2+a-2=0 \rightarrow (a+2)(a-1)=0$

$f(1)=5$

$a=-2$ غ ق ق

$a=1 \leftarrow$ قابل قبول

(۳)

$f(x)=\begin{cases} 2x^2-b & ; |x+1| \geq 2 \\ a+2x & ; -2 \leq x \leq -1 \end{cases}$

$x+1 \geq 2 \Rightarrow x \geq 1$

$x+1 \leq -2 \Rightarrow x \leq -3$ (۵)

$a+b=?$ $\quad$ if $x=-2 \rightarrow$ ✓ $2(-2)^2-b=a+2(-2)$

$8-b=a-4$

$a+b=8+4=12$

(۴)

$y=\sqrt{9x-a}+\sqrt{b-2x}$ $\quad 12-a=0$ $\quad b-4=0$

$a=12$ $\quad b=4$ ✓ (۵)

$D_y=\{2\}$ $\quad \frac{b}{a}=?$ $\quad \frac{b}{a}=\frac{4}{12}=\left(\frac{1}{3}\right)$

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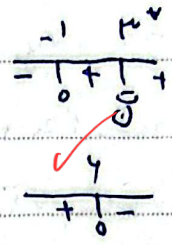
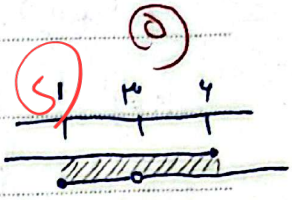
الف) $y=\sqrt[x+1]{\frac{x+1}{|x-3|}}+\sqrt{\frac{4-x}{x^2+2x+4}}$ $\quad x\neq 3$ $\quad x+1\neq -1 \Rightarrow x\neq -2$

صورت: $4-x\geq 0 \Rightarrow x\leq 4$

مخرج: $x^2+2x+4>0$ $\quad \Delta<0$

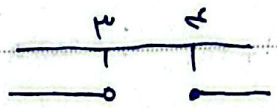




$D_f=[-1,3)\cup(3,4]$

ب) $y=\sqrt{[x]-4}+\sqrt{2-[x]}$

$[x]\geq 4 \quad x\geq 4$ $\quad 2-[x]\geq 0 \Rightarrow [x]\leq 2 \Rightarrow x<3$



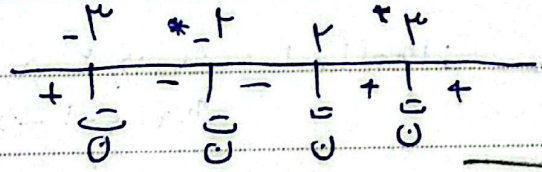
$D_f=\emptyset$ تهی

۴) الف) $y=\sqrt{\frac{x^2-x-6}{x^4-16}}$

$x^2-x-6 \rightarrow (x-3)(x+2)$ $\quad x=3 \quad x=-2$

$x^4-16 \rightarrow (x^2-4)(x^2+4)$

$x^2=4 \Rightarrow x=\pm 2$ $\quad x^2=-4$

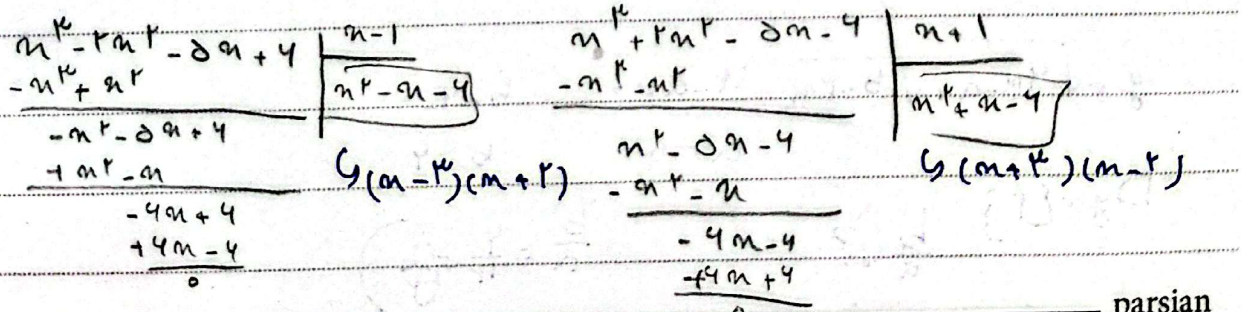


$D_f=(-\infty,-3)\cup(2,3)\cup(3,+\infty)$ ← پاسخ

ب) $y=\sqrt{\frac{x^3-2x^2-5x+6}{x^3+2x^2-5x-6}}$ $\quad \rightarrow (x-1)(x+3)(x+2)$

$(x+1)(x+3)(x-2)$

۱و۱



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الف) $y=\sqrt{[-x]-2}$ $\quad [-x]-2\geq 0$ (۷)

$[-x]\geq 2 \Rightarrow -x\geq 2$

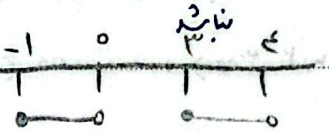
$x\leq -2$ $\quad D_f=(-\infty,-2]$

ب) $y=\frac{\Delta x^2+4x}{[x]^2-2[x]-3}$ $\quad ([x]-3)([x]+1)$

$[x]\neq 3 \quad [x]\neq -1$

$[x^2]-2[x]-3\neq 0 \quad 3\leq x<4$ یا $-1\leq x<0$

$D_f=(-\infty,-1)\cup[0,3)\cup[4,+\infty)$

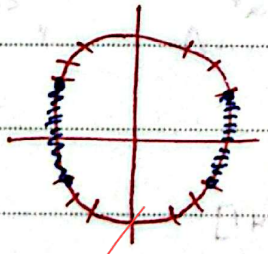


الف) $\frac{\cot x+1}{\tan x+1}$ $\quad \frac{\cos}{\sin}\rightarrow \sin\neq 0$ (۸)

$\tan\neq -1 \quad \cos\neq 0$

$\mathbb{R}-\{\frac{k\pi}{2}, k\pi+\frac{3\pi}{4}\}$

ب) $y=\sqrt{1-4\sin^2 x}$ $\quad 1-4\sin^2 x\geq 0$



$[k\pi-\frac{\pi}{4}, k\pi+\frac{\pi}{4}]$

$1\geq 4\sin^2 x$

$\frac{1}{4}\geq \sin^2 x \rightarrow -\frac{1}{2}\leq \sin x\leq \frac{1}{2}$

$[2k\pi+\frac{5\pi}{4}, 2k\pi+\frac{7\pi}{4}]\cup[2k\pi-\frac{\pi}{4}, 2k\pi+\frac{\pi}{4}]$

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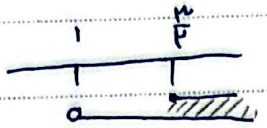
الف) $y=\sqrt{1-\log_{\frac{1}{2}}^{x-1}}$ $\quad 1-\log_{\frac{1}{2}}^{x-1}\geq 0 \rightarrow \log_{\frac{1}{2}}^{x-1}\leq 1$ (۹)

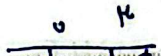
$x-1>0 \quad x>1 \qquad x-1\geq \frac{1}{2} \rightarrow x\geq \frac{3}{2}$



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

ب) $y=\frac{\sqrt{x^2-x}}{1-\log_{\varepsilon}^{x^2-3x}}$ $\quad x^2-x\geq 0 \quad x(x-1)\geq 1$

$x^2-3x>0 \quad x(x-3)>0$



$1-\log_{\varepsilon}^{x^2-3x}\neq 0 \quad \log_{\varepsilon}^{x^2-3x}\neq 1$

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

$x^2-3x-\varepsilon\neq 0 \rightarrow (x-\varepsilon)(x+1)\neq 0$

$x\neq \varepsilon,-1$

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

(۱۰)

الف) $\sqrt{2^{\varepsilon x-x^2}-\Lambda}$ $\quad 2^{\varepsilon x-x^2}-\Lambda\geq 0 \quad 2^{\varepsilon x-x^2}\geq 2^3$

$\varepsilon x-x^2\geq 3$

$\varsigma x^2-\varepsilon x+3\leq 0$

$(x-3)(x-1)\leq 0$

$D_f=[1,3]$

ب) $y=\left(\frac{3x+5}{2x+\varepsilon}\right)^{\frac{3x+5}{2x+\varepsilon}}\in W$ $\quad 3x+5\in 2xW+\varepsilon W$

$3x-2xW\in \varepsilon W-5$

$x(3-2W)\in \varepsilon W-5$

$x\in \frac{\varepsilon W-5}{3-2W}$

$D_f=\{x \mid x=\frac{4k-5}{3-2k}, k\in W\}$