Subject :
Year. Month. Date. ( )

دریا رمانی درویشی

تکلیف ۲

①
$2x^2+y^2-4x+6y+k=0 \longrightarrow 2x^2-4x+k_1=-6y-y^2$

$y^2+6y+k=-2x^2+4x \qquad (\sqrt{2}x-\sqrt{2})^2 \longrightarrow k=2 \qquad 2+9=11$

می‌خواهیم کامل کنیم ... باید عدد ۹ ...

$\longrightarrow y^2+6y+9=-2x^2+4x \longrightarrow (y+3)^2=-2x^2+4x$

$k=9$

②
$f(x)\begin{cases} x^2+4x & x\geq a \longrightarrow a^2+4a \\ 2x+a+2 & x<a \longrightarrow 2a+a+2=3a+2 \end{cases}$

$a^2+4a=3a+2$

$a^2+a-2=(a+2)(a-1)$

$a=-2,\ a=1$

$a>0 \quad a=1$

$f(1)=f(a)=3a+2=3\times1+2=5$ جواب

③
$f(x)\begin{cases} 2x^2-b & |x+1|\geq 2 \\ a+2x & -3<x<1 \end{cases}$

$\longrightarrow x+1\geq 2 \longrightarrow x\geq 1$

$\longrightarrow x+1\leq -2 \longrightarrow x\leq -3$

$f(-3)=2x^2-b=2\times(-3)^2-b=18-b$

$f(-3)=a+2x=a+2(-3)=a-6$

$18-b=a-6 \longrightarrow a+b=24$ جواب

④
$y=\sqrt{4x-a}+\sqrt{b-3x} \qquad D_f=\{2\}$

$4x-a\geq 0 \longrightarrow 4x\geq a \longrightarrow x\geq \frac{a}{4}$

$b-3x\geq 0 \longrightarrow 3x\leq b \longrightarrow x\leq \frac{b}{3}$

$\frac{b}{3}=\frac{a}{4}=2 \longrightarrow 4b=3a \longrightarrow \frac{b}{a}=\frac{3}{4}$ جواب

⑤
الف) $y=\sqrt{\frac{x+1}{|x-3|}}+\sqrt{\frac{6-x}{x^2+2x+4}} \longrightarrow (x+1)^2+3 \Rightarrow$ همواره مثبت

$\frac{x+1}{|x-3|}\geq 0$: $-1,\ 3$: $-\ +\ +$ $\longrightarrow [-1,3)\ (3,+\infty)$ | $\frac{6-x}{(x+1)^2+3}\geq 0$: 6: $+\ -$ $\longrightarrow (-\infty,6]$

$|x-3|$ همواره نامنفی

$D_f=[-1,3)\cup(3,6]$ جواب

ب) $\sqrt{[x]-4}+\sqrt{2-[x]}$

$[x]-4\geq 0 \longrightarrow [x]\geq 4 \longrightarrow [4,+\infty)$ | $2-[x]\geq 0 \longrightarrow [x]\leq 2 \longrightarrow (-\infty,3)$

$(-\infty,3)\cap[4,+\infty)=\varnothing$

$D_f=\varnothing$ جواب

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الف) $y=\sqrt{\dfrac{x^2-x-6}{x^4-13x^2+36}}$ $\longrightarrow (x-3)(x+2)\ \left[\begin{matrix}x=3\\x=-2\end{matrix}\right.$

$x^4-13x^2+36 \longrightarrow t^2-13t+36 \longrightarrow (t-9)(t-4) \rightarrow t=9 \rightarrow x^2=9 \rightarrow x=\pm 3$; $t=4 \rightarrow x^2=4 \rightarrow x=\pm 2$

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

ب) $y=\sqrt{\dfrac{x^3-2x^2-5x+6}{x^3+2x^2-5x-6}}$ $\longrightarrow$ ۰ = مجموع ضرایب $\longrightarrow (x^3-2x^2-5x+6)\div(x-1)=x^2-x-6$

$\longrightarrow$ مجموع ضرایب فرد = مجموع ضرایب زوج $\longrightarrow (x^3+2x^2-5x-6)\div(x+1)=x^2+x-6$

$\dfrac{(x-1)(x-3)(x+2)}{(x+1)(x+3)(x-2)}\geq 0$; $-3\ \ -2\ \ -1\ \ 1\ \ 2\ \ 3$: $+\ -\ +\ -\ +\ -\ +$ $\rightarrow D_f=(-\infty\ \ -3)\cup[-2\ \ -1)\cup[1\ \ 2)\cup[3\ \ +\infty)$

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الف) $y=\sqrt{[-x]-2} \rightarrow [-x]-2\geq 0 \longrightarrow [-x]\geq 2 \longrightarrow x\leq -2$

$[x]\leq -2$

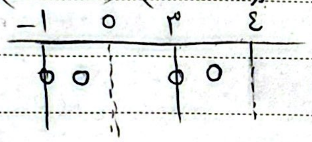
$D_f=(-\infty\ \ -2]$

ب) $y=\dfrac{5x^2+6}{[x]^2-2[x]-3}$

$[x]^2-2[x]-3\neq 0 \longrightarrow ([x]-3)([x]+1)$

$[x]\neq 3 \longrightarrow$

$[x]\neq -1$



$\mathbb{R}-\{[-1\ \ 0)\cup[3\ \ 4)\}=D_f$

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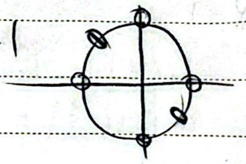
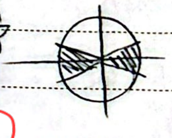
الف) $\dfrac{\cot x+1}{\tan x+1} \longrightarrow \dfrac{\frac{\cos x}{\sin x}+1}{\frac{\sin x}{\cos x}-1}$ $\quad \tan x\neq -1$, $\sin x\neq 0$, $\cos x\neq 0$



$D_f=\mathbb{R}-\{2k\pi\ ,\ 2k\pi+\frac{\pi}{2}\ ,\ 2k\pi+\frac{3\pi}{4}\ ,\ 2k\pi+\pi\ ,\ 2k\pi+\frac{3\pi}{2}\ ,\ 2k\pi+\frac{7\pi}{4}\}$

ب) $\sqrt{1-4\sin^2 x} \rightarrow 1-4\sin^2x\geq 0 \rightarrow 4\sin^2x\leq 1 \longrightarrow \sin^2x\leq\frac{1}{4} \longrightarrow -\frac{1}{2}\leq\sin x\leq\frac{1}{2}$

$D_f=[2k\pi-\frac{\pi}{6}\ ,\ 2k\pi+\frac{\pi}{6}]\cup[2k\pi+\frac{5\pi}{6}\ ,\ 2k\pi+\frac{7\pi}{6}]$



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الف) $y=\sqrt{1-\log_{\frac{1}{2}}^{x-1}}$ $\quad 1-\log_{\frac{1}{2}}^{x-1}\geq 0 \longrightarrow \log_{\frac{1}{2}}^{x-1}\leq 1 \longrightarrow x-1\geq\frac{1}{2} \rightarrow x\geq\frac{3}{2}$

① $x-1>0 \rightarrow x>1$

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

ب) $y=\dfrac{\sqrt{x^2-x}}{1-\log_4^{x^2-3x}}$

1) $x^2-x\geq 0 \longrightarrow x(x-1)$ $\quad + \ 0\ - \ 1\ +$ $\rightarrow (-\infty\ \ 0]\cup[1\ \ +\infty)$

2) $x^2-3x>0 \longrightarrow x(x-3)$ $\quad + \ 0\ - \ 3\ +$ $\rightarrow (-\infty\ \ 0)\cup(3\ \ +\infty)$

3) $1-\log_4^{x^2-3x}\neq 0 \rightarrow \log_4^{x^2-3x}\neq 1$

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

$(x-4)(x+1) \longrightarrow x\neq 4$, $x\neq -1$

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

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الف) $y=\sqrt{2^{4x-x^2}-8} \rightarrow 2^{4x-x^2}-2^3\geq 0$

$2^{4x-x^2}\geq 2^3 \rightarrow 4x-x^2\geq 3 \rightarrow x^2-4x+3\leq 0$

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

$D_f=[1\ \ 3]$

ب) $\left(\dfrac{3x+5}{2x+4}\right)! \rightarrow \dfrac{3x+5}{2x+4}\in W$

$3x+5=2xw+4w$

$3x-2xw=4w-5$

$x(3-2w)=4w-5 \rightarrow x=\dfrac{4w-5}{3-2w}$

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