پاسخنامه تشریحی ←

۱ ←

$2x^2+y^2-4x+6y+k=0 \qquad k=?$

$2x^2-4x+2+y^2+6y+9=0 \to 2(x-1)^2+(y+3)^2=0$

$\xrightarrow[\text{باشد}]{\text{هر ۲ مربع}}$ $k=2+9 \to \boxed{k=11}$ ✓ ۲

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۲ ←

$a^2+\cancel{a}=2\cancel{a}+a+2 \to a(a+1)=2 \to a=\pm1 \to a=1$

$f(1) \to 1+4=5$, $\; 2+1+2=5$ $\to \boxed{f(1)=5}$ ✓ ۲

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۳ ←

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

$|x+1|\geq 2 \to \left.\begin{matrix}x+1\geq 2\\ x+1\leq -2\end{matrix}\right\} \to \begin{matrix}x\geq 1\\ x\leq -3\end{matrix}$ ✓ ۳

$a+b=?$

$\longrightarrow f(-3) \to 18-b=a-6 \to \boxed{b+a=24}$

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۴ ←

$y=\sqrt{6x-a}+\sqrt{b-3x}$

$D_f=\{2\} \qquad \dfrac{b}{a}=?$

$6x-a\geq 0 \to 6x\geq a \to x\geq \dfrac{a}{6}$

$b-3x\geq 0 \to 3x\leq b \to x\leq \dfrac{b}{3}$

$\xrightarrow{\cap} \dfrac{a}{6}=\dfrac{b}{3}=2$, $\; a=12$, $\; b=6$ ✓ ۴

$\boxed{\dfrac{1}{2}=\dfrac{6}{12}=\dfrac{b}{a}}$

$\sqrt{\dfrac{x+1}{|x-3|}} \rightarrow$

	-1	
$-$	0	$+$

$|x-3|$ همیشه + و $x \neq 3$

$\rightarrow [-1,+\infty) - 3$

۵ ← الف ←

$-1 \quad 3 \quad 4$

$\sqrt{\dfrac{4-x}{x^2+2x+4}} \rightarrow 4-x \geq 0 \Rightarrow x \leq 4$

$\hookrightarrow \Delta = 4 - 4\times 4\times 1 < 0 \Rightarrow$ همیشه + و ریشه ندارد

$D_f = [-1,4] - \{3\}$

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۵ ← ب ←

$y = \sqrt{[x]-4} + \sqrt{2-[x]}$

$[x]-4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow [4,+\infty)$

$2-[x] \geq 0 \Rightarrow [x] \leq 2 \Rightarrow (-\infty,3)$

$\xrightarrow{\cap} D_f = \varnothing$

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۶ ← الف ←

$y = \sqrt{\dfrac{x^2-x-6}{x^4-13x^2+36}} = \sqrt{\dfrac{(x-3)(x+2)}{(x^2-4)(x^2-9)}}$

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

$2 \quad -2 \quad 3 \quad -3$

	-3		-2^{*}		2		3^{*}	
$+$	0	$-$	0	$-$	0	$+$	0	$+$

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

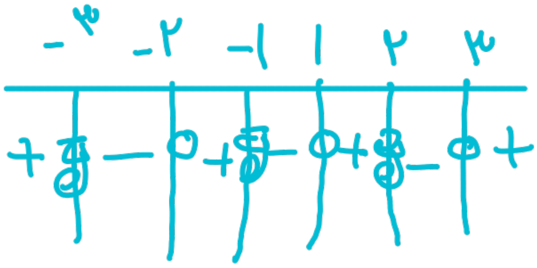
سوال ۶

$$\begin{array}{r|l} x^3-2x^2-5x+6 & x-1 \\ \hline -x^3+x^2 & x^2-x-6 \\ -x^2-5x & \\ x^2-x & \\ -6x+6 & \\ 6x-6 & \\ 0 & \end{array}$$

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

$$\begin{array}{r|l} x^3+2x^2-5x-6 & x+1 \\ \hline -x^3-x^2 & x^2+x-6 \\ x^2-5x & \\ -x^2-x & \\ -6x-6 & \\ 6x+6 & \\ 0 & \end{array}$$

$x^2+x-6 \to (x+1)(x-2)(x+3)$



$\to$ $\boxed{D_f = (-\infty,-3) \cup [-2,-1) \cup [1,2) \cup [3,+\infty)}$

سوال ۷

$y = \sqrt{[-x]-2} \to [-x] \geq 2 \to (-\infty,-2]$

$\boxed{D_f = (-\infty,-2]}$

سوال ۷

$[x]^2 - 2[x] - 3 \neq 0$

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

$[3,4) \cup [-1,0) \to$

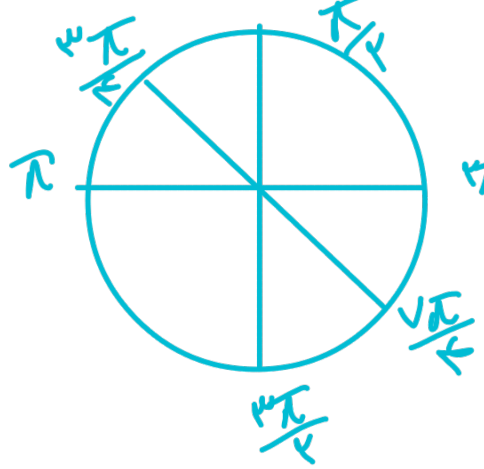
$D_f = R - \{[3,4) \cup [-1,0)\}$ یا

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

سوال ۸

$\cot x \to \sin x \neq 0$ $\quad$ $1 + \tan x \neq 0 \to \tan x \neq -1$

$\tan x \to \cos x \neq 0$



$2\pi \to$ $\boxed{D_f = R - \{ \frac{k\pi}{2}, k\pi - \frac{\pi}{4} \}}$

۲

$1 - 4\sin^2 x \geq 0 \to 4\sin^2 x \leq 1 \to -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$ ← گزینه ← ۸

$\to D_f = [k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6}]$

گزینه ← ۹

$1 - \log_{\frac{1}{2}}^{x-1} \geq 0 \to \log_{\frac{1}{2}}^{x-1} \leq 1 \to x - 1 \geq \frac{1}{2} \to$

$x - 1 > 0 \to x > 1 \quad \cap \quad x \geq 1.5$

$\to \boxed{D_f = [1.5, +\infty)}$

← گزینه ← ۹

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

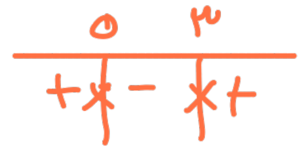
$x^2 - 3x \neq 4 \to x(x-3) \neq 4, -1$

$x^2 - x \geq 0 \to x(x-1) \geq 0$

	0		1	
+	0	−	0	+

$\to (-\infty, 0] \cup [1, +\infty)$

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



$$\boxed{D_f=(-\infty,0)\cup(3,+\infty)-\{4,-1\}}$$

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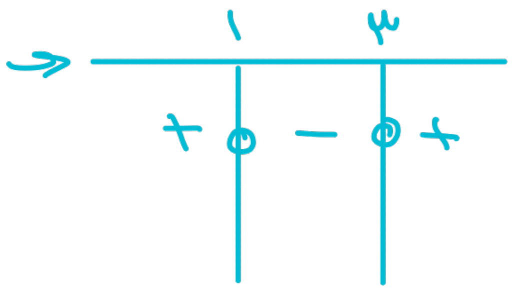
۱۰ ← الف ←

$$2^{4x-x^2}-8\geq 0 \rightarrow 2^3\left(2^{4x-x^2-3}-1\right)\geq 0$$

$$\Rightarrow 2^{4x-x^2-3}\geq 1 \Rightarrow 4x-x^2-3\geq 0 \Rightarrow x^2-4x+3\leq 0$$

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



$$\rightarrow \boxed{D_f=[1,3]}$$

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۱۰ ← ج ←

$$y=\left(\frac{3x+5}{2x+4}\right)!$$

$$\frac{3x+5}{2x+4}\in W \Rightarrow 3x+5=2xw+4w \Rightarrow$$

$$3x-2xw=4w-5 \Rightarrow x(3-2w)=4w-5 \Rightarrow x=\frac{4w-5}{3-2w}$$

$$\rightarrow \boxed{D_f=\left\{x \,\middle|\, x=\frac{4k-5}{3-2k},\ k\in W\right\}}$$