۱۸٫۲۵

رادین ملکیان یازدهم A

۱- $2x^2+y^2-4x+6y+k=0 \Rightarrow 2(x^2-2x)+y^2+6y+k=0$

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

$1, -3 \Rightarrow k=2+9=11$ ✓

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۲- $x=a \Rightarrow a^2+4a=3a+2 \Rightarrow a^2+a-2=0 \Rightarrow a=-2, 1 \;,\; a>0 \Rightarrow \boxed{a=1}$ ✓

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$f(1)=x^2+4x=1+4=5$ ✓

۳، $2x^2-b \;;\; |x+1| \geq 2 \Rightarrow x+1 \geq 2 \Rightarrow \{x \geq 1\}$ ✓

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$x+1 \leq -2 \Rightarrow x \leq -3$ ✓ if $x=-3 \Rightarrow 2x^2-b=a+2x \Rightarrow 18-b=a-6 \Rightarrow a+b=24$ ✓

۴- $y=\sqrt{6x-a}+\sqrt{b-3x} \Rightarrow$ if $x=2 \Rightarrow \sqrt{12-a}+\sqrt{b-6}=y=0 \Rightarrow a=12 \;,\; b=6$ ✓

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$\Rightarrow \frac{b}{a}=\frac{6}{12}=\frac{1}{2}$ ✓

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۵) الف

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$\sqrt{\frac{x+1}{|x-3|}} \Rightarrow x=-1, 3$ $\frac{-1 \quad 3}{- \; 0 \; + \; ت \; +}$ $\Rightarrow D_f=[-1,+\infty)-\{3\}$ ✓

$\sqrt{\frac{6-x}{x^2+2x+4}} \Rightarrow \sqrt{\frac{6-x}{x^2+2x+4}}$ $(\Delta=4-16=-12)$ $\frac{6}{+ \; 0 \; -} \Rightarrow (-\infty, 6]$ ✓ $\cap$ $[-1,3)\cup(3,6]$ ✓

ب) $\sqrt{[x]-4} \Rightarrow [x]-4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow x \geq 4$

$\sqrt{2-[x]} \Rightarrow 2-[x] \geq 0 \Rightarrow [x] \leq 2 \Rightarrow x<3$

$\Big\} D_f=\varnothing$ ✓

۶، الف)

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$\sqrt{\frac{x^2-x-6}{x^4-13x^2+36}} \Rightarrow \sqrt{\frac{(x-3)(x+2)}{(x-2)(x+2)(x-3)(x+3)}}$

$-3 \quad -2^{*} \quad 2 \quad 3$

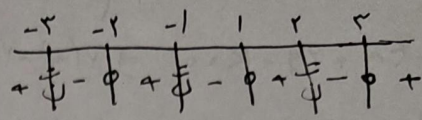
$+ \; ت \; - \; ت \; - \; ت \; + \; ت \; +$

$x^2=t \Rightarrow x^4-13x^2+36=t^2-13t+36=(t-4)(t-9)=(x-2)(x+2)(x-3)(x+3)$

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

ب)

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



$D_f = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [3, +\infty)$ ✓

الف) ۱۷

$g = \sqrt{[-x]-2} \Rightarrow [-x]-2 \geq 0 \Rightarrow [-x] \geq 2 \Rightarrow -x \geq 2 \Rightarrow x \leq -2$ ✓

ب) (۱,۲۵)

$g = \frac{5x^2+6}{[x]^2-2[x]-3} \Rightarrow [x]^2-2[x]-3 \neq 0 \quad \Delta = 4+12 = 16$

$\Rightarrow x_1 = \frac{4 \pm 4}{2} \Rightarrow [x] = -1, 3$

(۰,۲۵) $x \notin [-1, 0)$ (۰,۲۵) $x \notin [3, 4)$

$\Rightarrow [x] \neq -1, 3 \Rightarrow D_f = \mathbb{R} - \{[3,4) \cup [0,0)\}$ (۰,۲۵)

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$g = \frac{\cot x + 1}{\tan x + 1} \Rightarrow \underbrace{\tan x + 1 \neq 0}_{\tan x \neq -1 \Rightarrow k\pi + \frac{3\pi}{4}, k\pi - \frac{\pi}{4}}, \underbrace{\cos x \neq 0}_{\frac{k\pi}{2}}, \sin x \neq 0 \Rightarrow D_f = \mathbb{R} - \left\{k\pi + \frac{3\pi}{4}, k\pi - \frac{\pi}{4}, \frac{k\pi}{2}\right\}$ ✓ (۲)

ب)

~~$y = \sqrt{1-4\sin^2 x}$~~ $\Rightarrow 1-4\sin^2 x \geq 0 \Rightarrow 4\sin^2 x \leq 1 \Rightarrow \sin^2 x \leq \frac{1}{4} \Rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$ ✓

~~$D_f = [\frac{3\pi}{2}, \frac{4\pi}{3}]$~~ $D_f = [k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6}]$ ✓

الف) ۹

$y = \sqrt{1 - \log_{\frac{1}{2}}^{x-1}} \Rightarrow x-1 > 0 \Rightarrow x > 1$, $1 - \log_{\frac{1}{2}}^{x-1} \geq 0 \Rightarrow \log_{\frac{1}{2}}^{x-1} \leq 1 \Rightarrow x-1 \geq \frac{1}{2}$ (۱)

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

$D_f = (1, \frac{3}{2}] \cup [\frac{3}{2}, +\infty)$

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ب)

$g = \frac{\sqrt{x^2-2}}{1 - \log_4^{x^2-3x}}$

$x^2-2 \geq 0 \Rightarrow x(x-1) \geq 0$ ✓ $(-\infty, 0] \cup [1, +\infty)$

$1 - \log_4^{x^2-3x} \neq 0 \Rightarrow \log_4^{x^2-3x} \neq 1 \Rightarrow x^2-3x \neq 4 \Rightarrow x^2-3x-4 \neq 0$

$(x-4)(x+1) \neq 0$

$x \neq 4, -1$ ✓

$x^2-3x > 0 \rightarrow$ ۰ ۳ / + − +

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

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

الف) $g = \sqrt{2^{4x-x^2} - 8}$ $\Rightarrow 2^{4x-x^2} - 8 \geq 0 \Rightarrow 2^{4x-x^2} \geq 8$

$\Rightarrow 4x - x^2 \geq 3 \Rightarrow -x^2 + 4x - 3 \geq 0 \Rightarrow x^2 - 4x + 3 \leq 0 \Rightarrow (x-3)(x-1) \leq 0$

	1		3	
$x-3$	−	−	0	+
$x-1$	−	0	+	+

$\Rightarrow D_f = [1, 3]$ ✓

ب) $\frac{3x+5}{2x+4} \in W \Rightarrow 3x + 5 \in 2xW + 4W \Rightarrow 3x - 2xW \in 4W - 5$

$\Rightarrow x(3-2W) \in 4W - 5$

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