شهرزاد طلوعی شتری ۴ یازدهم

۱) الف)

$f(x)=\sqrt{\frac{x-1}{x}-\frac{x}{x-1}} \rightarrow \sqrt{\frac{x^2+1-2x-x^2}{x^2-x}} \rightarrow \sqrt{\frac{1-2x}{x^2-x}} \rightarrow \sqrt{\frac{1-2x}{x(x-1)}}$

$1=2x \rightarrow x=\frac{1}{2}$ $0 \quad \frac{1}{2} \quad 1$ $+ \; - \; + \; -$ $D_f \rightarrow (-\infty, 0) \cup [\frac{1}{2}, 1)$

ب) $f(x)=\dfrac{\frac{1}{x+1}-\frac{2}{x}}{\frac{3}{x-1}+\frac{1}{x+2}} \rightarrow \dfrac{\frac{x-2x-2}{(x+1)x}}{\frac{3x+6+x-1}{(x-1)(x+2)}} \rightarrow \frac{-x-2}{(x+1)x} \rightarrow x \neq -1, 0$

$\frac{4x+5}{(x-1)(x+2)} \rightarrow x \neq \frac{-5}{4}$ $\rightarrow x \neq 1, -2$

$D_f = R - \{-2, \frac{-5}{4}, -1, 0, 1\}$

۲) الف) $f(x)=\sqrt{((\frac{1}{3})^x-9)(32-4^x)} \rightarrow$ $\frac{1}{3}^{-2}=9$ $32-2^{2\times\frac{5}{2}}=0$ $-2 \quad \frac{5}{2}$ $+ \; - \; +$ $D_f=(-\infty,-2] \cup [\frac{5}{2}, +\infty)$

ب) $\sqrt[4]{x-1}+\sqrt{y+1}=3$ $\sqrt{y+1}=3-\sqrt[4]{x-1} \rightarrow 3-\sqrt[4]{x-1} \geq 0$

$\sqrt[4]{x-1} \leq 3 \rightarrow x-1 \leq 81 \rightarrow x \leq 82$, $x-1 \geq 0$ $x \geq 1$ $D_f=[1, 82]$

۳) $f(x)=\dfrac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \rightarrow x^2-x-2>0 \rightarrow (x-2)(x+1) \rightarrow$ $-1 \quad 2$ $+ \; - \; +$

$x^2-1>0$ $x^2>1 \rightarrow (-\infty,-1) \cup (1,+\infty) \xrightarrow{\cap}$

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

۴) $\sqrt{-x^2+ax+3}$ $D_f=[-2, b]$ $\xrightarrow{x=-2}$ $-4-2a+3=0 \rightarrow -1-2a=0$

$2a=-1$, $a=\frac{-1}{2}$ $-x^2-\frac{1}{2}x+3 \rightarrow 4x^2-x+6 \rightarrow x^2-x-12$

$(x-4)(x+2)=0$ $x=-2$ $x=\frac{3}{2}$ $\frac{3}{2}-\frac{1}{2}=1$

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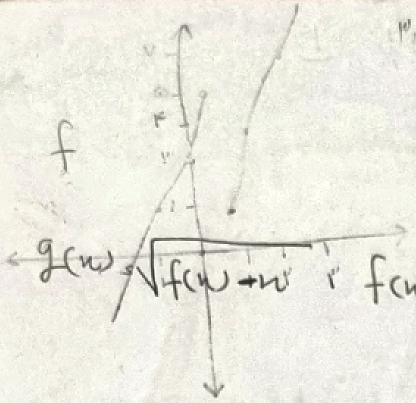

۵) $g(x)=\sqrt{f(x)-x}$: $f(x)-x\geq 0 \to$ $\quad D_f=[-3,+\infty)$

$3x-2-x\geq 0 \to 2x\geq 2$ $\boxed{x\geq 1}$ $\cap$

$2x+3-x\geq 0 \to x+3\geq 0$ $\quad x\geq -3$

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۶) $2(a+1)(7)\to 14(a+1)=3a-4+a \to 14a+14=3a-4 \to 10a=-18$

$\boxed{a=-1.8}$

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۷) $(2-\sqrt{3})(2+\sqrt{3})=4-3=1 \to \sqrt{2+\sqrt{3}}+\sqrt{2-\sqrt{3}}+\sqrt{2-\sqrt{3}}+\sqrt{2+\sqrt{3}}$

$\frac{1}{\sqrt{2+\sqrt{3}}}=\sqrt{2-\sqrt{3}}$ $\to 2\sqrt{2+\sqrt{3}}+2\sqrt{2-\sqrt{3}}+4 \to 2(\sqrt{2+\sqrt{3}}+\sqrt{2-\sqrt{3}})+4$

$t^2=2-\sqrt{3}+2+\sqrt{3}+2\sqrt{1}=6 \to t=\sqrt{6} \to \boxed{2\sqrt{6}+4}$

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۸) $2f(x)-3f(-x)=4x^2-x \xrightarrow{\times 2} 4f(x)-6f(-x)=8x^2-2x$

$2f(-x)-3f(x)=4x^2+x \xrightarrow{\times 3} 6f(-x)-9f(x)=12x^2+3x$

$-5f(x)=20x^2+x \to f(x)=\boxed{-\frac{20x^2+x}{5}}$

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۹) $x=0$: ~~$2f(0)=3m-1$~~

$x=-2$: $6f(0)=16+2m+3m-1$ $\to$ $-10f(0)=-15m-5$

$18f(0)=15m+45$

$8f(0)=50 \to f(0)=\frac{50}{8}=\frac{25}{4}=6.25$

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۱۰)

$$f(x)+f\left(\frac{1}{x}\right)=\frac{۳۰x^{۲}-۱۲x+۳۰}{x}$$

$$ax+b+\frac{a}{x}+b=\frac{۳۰x^{۲}-۱۲x+۳۰}{x}\rightarrow\frac{ax^{۲}+۲bx+a}{x}\rightarrow\frac{۳۰x^{۲}-۱۲x+۳۰}{x}\rightarrow ۲b=-۱۲$$

$$\boxed{a=۳۰}\quad\boxed{b=-۶}$$

$$y=ax+b\rightarrow f(x)=۳۰a-۶\rightarrow f(-۱)=-۳۰-۶=\boxed{-۹}$$