پاسخنامه تشریحی تکلیف شماره «۱۴» کلاس یازدهم تجربی B «نیایش املاکی»

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الف) $\sqrt{\frac{x-1}{x}-\frac{x}{x-1}} \Rightarrow \frac{x-1}{x}-\frac{x}{x-1}\geq 0$

$\Rightarrow \frac{(x-1)^2-x^2}{x^2-x}\geq 0 \Rightarrow \frac{x^2-2x+1-x^2}{x^2-x}$

$\Rightarrow \frac{-2x+1}{x^2-x}$ ، $\frac{1}{2}$ ، $x\neq 0,1$

0		$\frac{1}{2}$		1	
+		−		+	−

$D_f=(-\infty,0)\cup[\frac{1}{2},1)$

ب) $\frac{\frac{1}{x+1}-\frac{2}{x}}{\frac{3}{x-1}+\frac{1}{x+2}} = \frac{\frac{x-2x-2}{x^2+x}}{\frac{3x+6+x-1}{x^2+x-2}} = \frac{(-x-2)(x^2+x-2)}{(x^2+x)(4x+5)}$ → $-\frac{5}{4}$

$x(x+1)$ ، $x\neq 0,-1$

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

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الف) $\sqrt{((\frac{1}{3})^x-9)(32-4^x)}$

-2 ، $(2^2)^x=2^5 \Rightarrow x=2.5$

−2		2.5	
+	−		+

$D_f=(-\infty,-2]\cup[2.5,+\infty)$

ب) $\sqrt[4]{x-1}+\sqrt{y+1}=3$

$\Rightarrow \sqrt[2]{x-1}+y+1=9 \Rightarrow y=8-\sqrt{x-1}$

$\Rightarrow x-1\geq 0 \Rightarrow x\geq 1$

$D_f=[1,+\infty)$

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$\frac{\log_4(x^2-x-2)}{\sqrt{x^2-1}+1}$ ، $x^2-x-2>0 \Rightarrow (x-2)(x+1)>0$

−1		2	
+	−		+

I

$x^2-1\geq 0 \Rightarrow \mathbb{R}-\{0\}$ II

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

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$\sqrt{3+ax-x^2}$ ، $D_f=[-2,b]$ ، $a+b=?$

$3-2a-4=0 \Rightarrow -2a=1 \Rightarrow a=-\frac{1}{2}$

$\times 2\ (3-\frac{1}{2}x-x^2\geq 0) \Rightarrow 2x^2+x-6\geq 0 \Rightarrow x^2+x-12\geq 0 \Rightarrow (x+4)(x-3)$

$\Rightarrow \begin{cases} x=-4 \Rightarrow -\frac{4}{2} \Rightarrow -2 \\ x=3 \Rightarrow \frac{3}{2} \Rightarrow b=\frac{3}{2} \end{cases}$

$a+b=-\frac{1}{2}+\frac{3}{2}=+1$

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$g(x)=\sqrt{f(x)-x}$

$f(x)=\begin{cases} 3x-2 & x\geq 1 & \mathbb{R} \\ 2x+3 & x<1 & (-3,+\infty) \end{cases} \cap$

$D_f=(-3,+\infty)$

$2f(3) = f(-1) + a \quad a = ?$ $\quad f(x) = \begin{cases} (a+1)(x+2) & x > 1 \\ 3a + 2x & x \le 1 \end{cases}$

$2(7a+7) = 3a - 6 + a$

$14a + 14 = 4a - 6 \Rightarrow 10a = -18 \Rightarrow a = -1.8$ — 4

$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2 \quad f(2-\sqrt{3}) + f(2+\sqrt{3}) = ?$

$\sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2 + \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2 = 2\sqrt{6} + 4$ — 2

$\Rightarrow \sqrt{\left(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}\right)^2} = \sqrt{2 - \sqrt{3} + 2 + \sqrt{3} + 2} = \sqrt{6}$

$\Rightarrow \sqrt{\left(\frac{1}{\sqrt{2-\sqrt{3}}} + \frac{1}{\sqrt{2+\sqrt{3}}}\right)^2} = \sqrt{\frac{1}{2-\sqrt{3}} + \frac{1}{2+\sqrt{3}} + 2} = \sqrt{\frac{2+\sqrt{3}+2-\sqrt{3}}{1} + 2} = \sqrt{6}$

$\times 2 \quad 2f(x) - 3f(-x) = 4x^2 - x$

$\times 3 \quad 2f(-x) - 3f(x) = 4x^2 + x$

$4f(x) - 6f(-x) = 8x^2 - 2x$

$6f(-x) - 9f(x) = 12x^2 + 3x$

$-5f(x) = 20x^2 + x \Rightarrow 2f(x) = -4x^2 - \frac{x}{5}$ — 1

$(x+1)f(x) - 3xf(x+1) = 4x^2 - mx + 3m - 1 \quad , f(0) = ?$

if $x = -2 \Rightarrow -2 + 3m + 3m - 1 + 19 = 0 \Rightarrow 6m = -16 \Rightarrow m = -3$

if $x = 0 \Rightarrow 2f(0) = 2f(0) = 3m - 1 = -10 \Rightarrow 2f(0) = -5$ — 9

$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^2 - 12x + 3}{x} \quad x \neq 0$

$f(x) = ax + b$

$f\left(\frac{1}{x}\right) = \frac{a}{x} + b$

$\Rightarrow f(x) + f\left(\frac{1}{x}\right) = ax + \frac{a}{x} + \underbrace{2b}_{-12}$

$a = 3 \; , \; b = -6$

$\Rightarrow 2f(x) = ax + b = 3x - 6$

$\Rightarrow 2f(-1) = -9$ — 10

$\frac{3x^2 - 12x + 3}{x} = 3x - 12 + \frac{3}{x}$