ملکا محمدی — ۱۹,۵ — دفتر یازدهم ریاضی C

①

$f(x) = \left(\frac{1}{2}\right)^{x-2} - 1 \to y = \sqrt{x^3 \underbrace{f(x+1)}_{\left(\frac{1}{2}\right)^{x-1} - 1}} = ?$

$\left(\frac{1}{2}\right)^{x-1} - 1 \to x^3 \times \frac{1}{2}^{x-1} - 1 \geq 0$

$x^3 \to 0$

0		1	
−	+		−

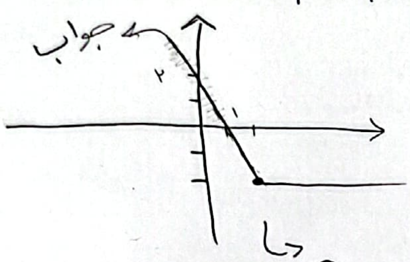
$\left(\frac{1}{2}\right)^{x-1} = 1 \to x-1=0 \leftarrow \left(\frac{1}{2}\right)^{x-1} - 1 = 0$

$\to x = 1$

$\to D = [0, 1]$

②

$f(-x) = \sqrt{-x + |-x+2|} \to -x + \underbrace{|2-x|}_{2} \geq 0$



	2	
$-x+2-x = -2x+2$		$-x-2+x = -2$

$x = 2 \to -2 + |0| = -2$

$\to D_f = (-\infty, 1]$

③

$y = \sqrt{\frac{x-1}{f(x)}}$

	−5		−4		1		2		3
$f(x)$	0	+	0	−		−	0	+	0
$x-1$		−		−	0	+		+	
y	∄	−	∄	+	0	−	∄	+	∄

$\to D_f = (-4, 1] \cup (2, 3)$

④

$y_1 = \frac{1}{9x^4 - 7x^2 - 4x - 3} \neq 0$, $y_2 = \frac{1}{3x^2 + ax + b}$, $\sqrt{-(a+b)} = ?$

$-7x^2 \to -6x^2 - x^2$, $-3 \to -4 + 1$

$\underbrace{(9x^4 - 6x^2 + 1)}_{(3x^2-1)^2} - \underbrace{x^2 - 4x - 4}_{-(x+2)^2} \to (3x^2-1)^2 - (x+2)^2 \neq 0$

$\to 3x^2 - 1 = x + 2$

$3x^2 - x - 3 = 0$

$\sqrt{-(a+b)} = \sqrt{4} = 2$

$3x^2 + ax + b \to a = -1$

$b = -3$

5

$f(x)=x^3+x \to y=\sqrt{f(x)-f\left(\frac{4}{x}\right)}$ $D_f=?$

$=\sqrt{x^3+x-\frac{64}{x^3}-\frac{4}{x}}\geq 0 \to \frac{x^6+4x^4-4x^2-64}{x^3}\geq 0$ $\xrightarrow{x^2=t}$

د

$\to x\neq 0$ (1)

$(t-4)t$

$t^3+t^2+4t-64=(t-4)(t^2+5t+16)$

$(t-4)(t^2+4t+16)$ $\quad t=4$ $\quad \Delta=25-64<0$

$\downarrow$

$x^2=4 \to x=\pm 2$ (2)

-2	0	2
$-$	$+$	$-$ $+$

$D_f=[-2,0)\cup[2,+\infty)$

6

$(x^3+x)=2x^3-1$ $\quad f(2)+f(10)=?$

$x^3+x-2=0 \to$

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

$\Delta=-7<0$

$(x-1)(x^2+x+2)$

$\to x=1 \to f(2)$

$=2-1=1$

د

$x^3+x-10=$

$-8 \quad -2$

$-(x-2)(x^2+2x+5)$

$\Delta=-16<$

$\to x=2$

$f(10)=4\times 2-1=7$

$\Rightarrow f(2)+f(10)=1+7=8$

$\frac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)}=\frac{(\sqrt[3]{7}\cancel{-3+3})^3-27}{(\sqrt[3]{2}\cancel{+2-2})^3+8}=\frac{-20}{10}$

$=-2$

7

$f(x)=x^3-6x^2+12x+8-8$

$=(x-2)^3+8$

د

$g(x)=x^3+9x^2+27x$
$+27-27$

$(x+3)^3-27$

8

$f(x)=\sqrt{x+4\sqrt{x-4}-4+4}$ $\quad g(x)=\sqrt{x-4\sqrt{x-4}-4+4}$ $\quad x\geq 4$

$|\sqrt{x-4}+2|$ $\quad |\sqrt{x-4}-2|$

د

$f(x)+g(x)=a+b\sqrt{x+c}$

$\xrightarrow{4\leq x<8}$ $\sqrt{x-4}+2+2-\sqrt{x-4}=4$

$\xrightarrow{x\geq 8}$ $\sqrt{x-4}+2+\sqrt{x-4}-2=0+2\sqrt{x-4}$

$\frac{a+b}{c}=?$

$0+2\sqrt{x-4}=a+b\sqrt{x+c}$

$a=0 \quad b=2 \quad c=-4$

$\frac{0+2}{-4}=-\frac{1}{2}$

(۹)

$$f(x) = \frac{x+2}{x^2-4x+3} \neq 0 \Rightarrow \underbrace{(x-1)}_{1}\underbrace{(x-3)}_{3} \neq 0$$

$$\neq 0 \rightarrow x = -2, 1, 3 \rightarrow$$ ۰ و ٤ از و باقی می‌مانند

$$f(2) = -4 \ , \ f(0) = \frac{2}{3} \rightarrow \frac{g}{f} = \left\{\left(2, \frac{-1}{4}\right), (0, 6)\right\}$$

(۱۰)

الف) $f(2x) = \left\{\left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), (2, 2), \left(-\frac{1}{2}, 6\right)\right\}$

۱,۵

ب) $f(x^2) = \left\{(1, 2), (\sqrt{3}, -1), (2, 2)\right\}$

ج) $2g^2(x) + 1 = \left\{(-2, 19), (1, 3), (3, 9), (-1, 1)\right\}$

د) $\frac{2f}{g} = \left\{(1, -4), (3, -1)\right\}$

۱۰ ب)

$$\begin{cases} x^2 = 1 \rightarrow x = \pm 1 \\ x^2 = 3 \rightarrow x = \pm 3 \\ x^2 = 4 \rightarrow x = \pm 2 \\ x^2 = -1 \rightarrow \times \end{cases} \rightarrow \left\{(\pm 1, 2)(\pm\sqrt{3}, -1)(\pm 2, 2)\right\}$$