۱۹٫۵

تکلیف شماره ۵ — حسابان دوسری — یازدهم ریاضی A

①

$$f(x) = \left(\frac{1}{2}\right)^{x-2} - 1$$

$$x+1 \to \left(\frac{1}{2}\right)^{x-1} - 1$$

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

$$x^3 \to 0 \qquad \frac{1}{2}^{x-1} = 1 \to x-1=0,\quad x=1$$

	0		1	
$-$		$+$		$-$

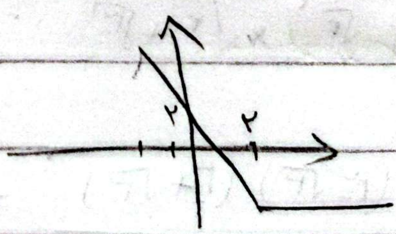
$$D_f = [0, 1]$$

②

$$f(x) = \sqrt{x + |x+2|}$$

$$f(-x) \to f(-x) = \sqrt{-x + |-x+2|}$$

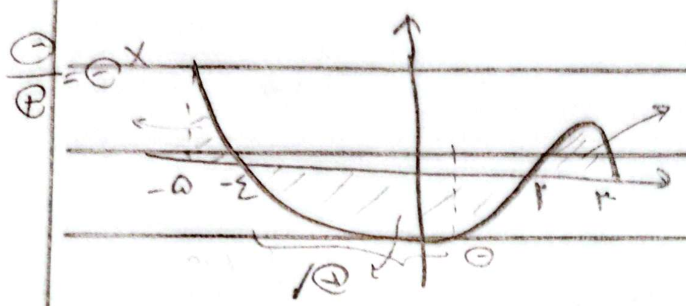
2	
$-x-x+2$	$\underbrace{-x+x-2}$
$-2x+2$	-2



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

③

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



$\sqrt{\dfrac{x-1 \to \oplus}{f(x)\to\oplus}}\ \oplus$ ✓

$D_f=(-۴,۱]\cup(۲,۳)$

	-۵		-۴		۲		۳
$x-1$	−	−		+		+	
$f(x)$	+ ۰	−		−	۰	+	۰
$\sqrt{\dfrac{x-1}{f(x)}}$	− ∄	+	۰	−	∄	+	∄

④

$9x^4-7x^2-4x-3-4+1$

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

$(3x^2-1)^2\neq(x+2)^2\to(3x^2-1)\neq x+2\to 3x^2-x-3=0$

⑤

$\sqrt{-(a+b)}=\sqrt{-(-1-3)}=2$ جواب سوال

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

$b=-3$

$f(x)=x^3+x$

$\sqrt{x^3+x-\left(\frac{4}{x}\right)^3-\frac{4}{x}}\to x^3+x-\frac{64}{x^3}-\frac{4}{x}\geq 0$

موضوع: ________ تاریخ: / /

$$\frac{x^{3}-4}{x}+\frac{x^{6}-64}{x^{3}}\geq 0$$

$$\frac{x^{4}-4x^{2}+x^{6}-64}{x^{3}}\geq 0$$

$x^{3}\neq 0 \Rightarrow x\neq 0$

$$x^{6}+x^{4}-4x^{2}-64=x^{6}-64+x^{4}-4x^{2}\quad \xrightarrow{x^{2}=t}$$

$$t^{3}+t^{2}-4t-64=t^{3}-64+t^{2}-4t=$$

$$(t-4)(t^{2}+4t+16)+t(t-4)=(t-4)(\underbrace{t^{2}+5t+16}_{\Delta<0})$$

$$t=4\rightarrow x^{2}=4\rightarrow x=\pm 2$$

$$\begin{array}{ccccccc} & -2 & & 0 & & 2 & \\ - & | & + & | & - & | & + \end{array}$$

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

$$\left.\begin{array}{l} x=2\rightarrow f(10)=7 \\ x=1\rightarrow f(2)=1 \end{array}\right\}\quad f(10)+f(2)=1+7=8$$

9

(7)

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

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

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

$$= \frac{7 - 27}{2 + 8} = \frac{-20}{10} = \boxed{-2}$$

(8)

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

$$g(x) = \sqrt{x - 4\sqrt{x-4}}$$

$$x \geq 4$$

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

$$\sqrt{x + 4\sqrt{x-4} + 4 - 4} = \sqrt{(\sqrt{x-4} + 2)^2} = \left|\sqrt{x-4} + 2\right|$$

$$\sqrt{x - 4\sqrt{x-4} - 4 + 4} = \sqrt{(\sqrt{x-4} - 2)^2} = \left|\sqrt{x-4} - 2\right|$$

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

$x \geq 8$: $\sqrt{x-4} + 2 + \sqrt{x-4} - 2 = 2\sqrt{x-4} \Rightarrow a = 0,\ b = 2,\ c = -4$

$$\frac{a+b}{c} = \frac{2}{-4} = \boxed{\frac{-1}{2}}$$

$f(x)\ \frac{x+2}{x^2-4x+3} \longrightarrow (x-3)(x-1) \Longrightarrow \begin{matrix} x \neq 1 \\ x \neq 3 \end{matrix}$ ۱

$\frac{g}{f} = \frac{\{(3,1)\ ,\ (0,4)\}}{\{(3,-4)\ ,\ (0,\frac{2}{3})\}} = \{(3,\frac{-1}{4}),(0,6)\}$ ۵

۱۰

~~الف) $f(2x)$ = ...~~

~~ب) $f(x^2)$ = ...~~

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

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

~~ج) ...~~ ۱/۵

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

د) $\frac{2f}{g} = \frac{\{(1,4)\ ,(3,-2)\ ,\cancel{(4,4)}\ ,(-1,12)\}}{\{(1,-1)\ ,(3,2)\ ,(-1,0)\}} =$

$\{(1,-4),(3,-1)\ ,\cancel{\tfrac{1}{0}}\} = \{(1,-4),(3,-1)\}$

۱۰ ب) $\begin{cases} x^2=1 \rightarrow x=\pm 1 \\ x^2=3 \rightarrow x=\pm\sqrt{3} \\ x^2=4 \rightarrow x=\pm 2 \\ x^2 = \ldots \end{cases} \longrightarrow \{(\pm1,2)(\pm\sqrt{3},-1)(\pm2,2)\}$

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