نام و نام خانوادگی ...سهیل بهرامی... پاسخنامه تشریحی تکلیف شماره ..۵.. کلاس .یازدهم پسر B...

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

$y = \sqrt{x^3 f(x+1)} \Rightarrow x^3 f(x+1) \geq 0$

$\Rightarrow x^3 \times (2^{1-x} - 1) \geq 0$

	0		1	
−		+		−

$D_f = [0,1]$

۲

$f(x) = \sqrt{x + (x+2)} \Rightarrow f(-x) = \sqrt{-x + (-x+2)} \Rightarrow -x + (-x+2) \geq 0$

$(-x+2) = (x-2)$

$\Rightarrow -x + (x-2) \geq 0 \longrightarrow$

	2	
$-2x+2$		-2
$-2x+2 \geq 0$		$-2 < 0$
$+2x \leq 2$		
$x \leq 1$		

$\Rightarrow (-\infty, 1]$

۳

$y = \sqrt{\frac{x-1}{f(x)}} \rightarrow \frac{x-1}{f(x)} \geq 0$

	−4		1		2		3
−		+		−		+	

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

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$y_1 = \frac{1}{9x^4 - 7x^2 - 4x - 3} = \frac{1}{(9x^4 - 6x^2 + 1) - (x^2 + 4x + 4)} = \frac{1}{(3x^2-1)^2 - (x+2)^2} = \frac{1}{\underbrace{(3x^2+x+1)}_{\text{ریشه ندارد}}(3x^2-x-3)}$

$\Rightarrow D_{y_1} = \mathbb{R} - \{$ ریشه‌های $3x^2 - x - 3 \} = D_{y_2} = \mathbb{R} - \{$ ریشه‌های $3x^2 + ax + b \}$

$\Rightarrow 3x^2 - x - 3 = 3x^2 + ax + b \Rightarrow \begin{cases} a = -1 \\ b = -3 \end{cases} \Rightarrow a + b = -4 \quad -(a+b) = 4 \quad \sqrt{4} = 2$

۵

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

$f(\frac{4}{x}) = (\frac{4}{x})^3 + \frac{4}{x} = \frac{64}{x^3} + \frac{4}{x}$

$\Rightarrow f(x) - f(\frac{4}{x}) = x^3 + x - \frac{64}{x^3} - \frac{4}{x}$

$y = \sqrt{f(x) - f(\frac{4}{x})} \Rightarrow f(x) - f(\frac{4}{x}) \geq 0$

$\Rightarrow (x^3 - \frac{64}{x^3}) + (x - \frac{4}{x}) \geq 0$

$\Rightarrow (x - \frac{4}{x})(x^2 + 4 + \frac{16}{x^2}) + (x - \frac{4}{x}) \geq 0 \Rightarrow (x - \frac{4}{x})(x^2 + 4 + \frac{16}{x^2} + 1)$

	−2		2	
+		−		+

$D_f = \mathbb{R} - (-2,2)$

$x = \frac{4}{x}$

$x^2 = 4 \Rightarrow x = \pm 2$

$x^4 + 5x^2 + 16 \Rightarrow$ ریشه ندارد همواره مثبت

$f(x^3+x)=2x^2-1 \quad \xrightarrow{x=1} f(1+1)=2(1)^2-1 \Rightarrow f(2)=1$ $\xrightarrow{x=2} f(8+2)=2(2)^2-1 \Rightarrow f(10)=7$ $\Rightarrow f(2)+f(10)=1+7=8$	۶
$f(x)=x^3-6x^2+12x = x^3-6x^2+12x-8+8 \Rightarrow (x-2)^3+8 \Rightarrow f(\sqrt[3]{2}+2)=(\sqrt[3]{2})^3+8=10$ $g(x)=x^3+9x^2+27x = x^3+9x^2+27x-27+27=(x+3)^3-27 \Rightarrow g(\sqrt[3]{7}-3)=(\sqrt[3]{7})^3-27=-20$ $\frac{-20}{10}=-2$	۷
$f(x)=\sqrt{x+4\sqrt{x-4}} = \sqrt{x-4+4\sqrt{x-4}+4} = \sqrt{(\sqrt{x-4}+2)^2} = \lvert\sqrt{x-4}+2\rvert = \sqrt{x-4}+2$ $g(x)=\sqrt{x-4\sqrt{x-4}} = \sqrt{x-4-4\sqrt{x-4}+4} = \sqrt{(\sqrt{x-4}-2)^2} = \lvert\sqrt{x-4}-2\rvert \Rightarrow \begin{cases}\sqrt{x-4}-2 & x\geq 8\\ -\sqrt{x-4}+2 & 4\leq x<8\end{cases}$ $\Rightarrow f(x)+g(x) \Rightarrow \begin{cases} a \quad b \\ 0+2\sqrt{x-4}_c \\ 4+0\sqrt{x-4}_c\end{cases} \quad x\geq 8 \Rightarrow \frac{a+b}{c}=\frac{2}{-4}=-\frac{1}{2}$ $4\leq x<8 \Rightarrow \frac{a+b}{c}=\frac{4}{-4}=-1$	
$g(x)=\{(2,1),(1,0),(3,5),(0,4)\} \Rightarrow D_g=\{1,3,0,2\}$ $f(x)=\frac{x+2}{x^2-4x+3} \Rightarrow D_f=\mathbb{R}-\{1,3\}$ $\quad \overset{\cap}{\Rightarrow} \{0,2\}$ $f(2)=-4$ $f(0)=\frac{2}{3}$ $\quad \frac{g}{f}=\{(2,-\frac{1}{4}),(0,6)\}$	۹
الف) $f(2x)=\{(\frac{1}{2},2),(\frac{3}{2},-1),(2,2),(-\frac{1}{2},6)\}$ ب) $f(x^2)=\{(1,2),(-1,2),(\sqrt{3},-1),(-\sqrt{3},-1),(2,2),(-2,2)\}$ ج) $2g^2(x)+1 = \{(-2,19),(1,3),(3,9),(-1,1)\}$ د) $\frac{2f}{g}=\{(1,-4),(3,-1)\}$	۱۰