نام و نام خانوادگی : آیلین عقیلی ۲۰ کد تکلیف : ۵ کلاس : تجربی یازدهم [illegible]

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

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۱ $y = \sqrt{x^3 f(x+1)} \rightsquigarrow f(x+1) = 2^{2-(x+1)} - 1 = 2^{1-x} - 1 \rightarrow y = \sqrt{x^3(2^{1-x}-1)} \rightarrow x^3(2^{1-x}-1) \geq 0$

ریشه : (0) (1)

$\boxed{D_f : [0,1]} \leftarrow$ 0 1 : − + −

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

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$f(-x) = \sqrt{-x+|2-x|} \rightsquigarrow |2-x| - x \geq 0$ ، $2-x \geq x \rightarrow 2x \leq 2 \rightarrow x \leq 1$

$|2-x| \geq x$ ∪ $2-x \leq -x$ ✗

۲ $\Rightarrow \boxed{D_f : (-\infty, 1]}$

$y = \sqrt{\frac{x-1}{f(x)}} \rightarrow \frac{x-1}{f(x)} \geq 0$: (1) ، (−4) (2) (3) $\rightarrow$ −4 1 2 3 : − + − + ×

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۳ $\boxed{D_f : (-4, 1] \cup (2, 3)}$

$y_1 = \frac{1}{9x^4 - 7x^2 - 4x - 3} \rightsquigarrow 9x^4 - 7x^2 - 4x - 3 = 9x^4 - 6x^2 - x^2 - 4x - 4 + 1$

$= 9x^4 - 6x^2 + 1 - (x^2+4x+4)$

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

$y_2 = \frac{1}{3x^2+ax+b} \rightarrow D_{y_2} = 3x^2+ax+b \neq 0$

$3x^2 - 1 \neq -x-2$ ، $3x^2 - 1 \neq x+2$ ۴

$3x^2 + x + 1 \neq 0$ ، $3x^2 - x - 3 \neq 0 : D_{y_1}$

$D_{y_1} = D_{y_2} \rightsquigarrow 3x^2 + ax + b = 3x^2 - x - 3$ (−) همواره $\Delta < 0$ ✓

$a = -1$, $b = -3 \Rightarrow \sqrt{-(a+b)} = \sqrt{4} = 2$

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

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

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$\underbrace{x^3 - \frac{64}{x^3}} + x - \frac{4}{x}$

۵ $y = \sqrt{\underbrace{f(x)}_{x^3+x} - \underbrace{f(\frac{4}{x})}_{(\frac{4}{x})^3 + \frac{4}{x}}} = \sqrt{x^3 + x - \frac{64}{x^3} - \frac{4}{x}}$

$(x - \frac{4}{x})(x^2 + 4 + \frac{16}{x^2}) + (x - \frac{4}{x}) =$

$(x - \frac{4}{x})(x^2 + 5 + \frac{16}{x^2}) \geq 0$

$\frac{x^2-4}{x} \geq 0$ ، $x - \frac{4}{x} \geq 0$

$x^2 = t : t + \frac{16}{t} + 5 \xrightarrow{\times t} t^2 + 5t + 16$ (+) همواره $\Delta < 0$

−2 0 2 : − + − + $\boxed{D_f : [-2, 0) \cup [2, +\infty)}$

$f(x^3+x) = 2x^2-1 \rightarrow f(2):\ x^3+x=2$ $\rightarrow f(2) = 2(1)^2-1$

$x^3+x-2=0$

$x^3+x-2 \,|\, x-1$, x^2+x+2 $= (x-1)(x^2+x+2)$, $\Delta<0$, $x=1$, $f(2)=1$

$x=2$

$f(10) = 2(2)^2-1 = 7 \rightarrow f(10)=7$

$f(2)+f(10) = 1+7 = 8$ 6

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

$g(x) = x^3+9x^2+27x+27-27 = (x+3)^3-27$ $\rightsquigarrow \dfrac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)} = \dfrac{-20}{10} = -2$ 7

$\Rightarrow g(\sqrt[3]{7}-3) = (\sqrt[3]{7}-3+3)^3-27 = -20$

$\Rightarrow f(\sqrt[3]{2}+2) = (\sqrt[3]{2}+2-2)^3+8 = 10$

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

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

$f(x)+g(x) = |\sqrt{x-4}+2| + |\sqrt{x-4}-2|$

$4 \le x \le 8:\ \sqrt{x-4}+2+2-\sqrt{x-4} = 4$ ثابت

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

$a+b\sqrt{x+c}$ $\begin{cases} a=0 \\ b=2 \\ c=-4 \end{cases}$ $\rightarrow \dfrac{a+b}{c} = \dfrac{2}{-4} = -\dfrac{1}{2}$

$f(x) = \dfrac{x+2}{x^2-4x+3} = \dfrac{x+2}{(x-1)(x-3)} \rightarrow D_f: \mathbb{R}-\{1,3\}$

$\Rightarrow D(f\cap g) = \{2,0\}$

$g(x) = \{(2,1)(1,0)(3,5)(0,4)\} \rightarrow D_g: \{2,1,3,0\}$ 9

$\dfrac{g}{f}:\ (2,\tfrac{1}{-4})(0,\tfrac{4}{\frac{2}{3}}) = \boxed{\{(2,-\tfrac{1}{4}),(0,6)\}}$

$f(x) = \{(1,2)(3,-1)(4,2)(-1,6)\}$

$g(x) = \{(-2,3)(1,-1),(3,2)(-1,0)\}$ $\rightarrow D(f\cap g) = \{1,3,-1\}$ 10

الف) $f(2x) = \{(\tfrac{1}{2},2)\,(\tfrac{3}{2},-1)\,(2,2)\,(\tfrac{-1}{2},6)\}$
$2x=1 \quad 2x=3 \quad 2x=4 \quad 2x=-1$

ج) $2g^2(x)+1:$
$\{(-2,19)(1,3)(3,9)(-1,1)\}$
$2(3)^2+1 \quad 2(-1)^2+1 \quad 2(2)^2+1 \quad 2(0)^2+1$

ب) $f(x^2) = \{(-1,2)(1,2)(\sqrt{3},-1)(-\sqrt{3},-1)\}$
$x^2=1 \quad x^2=3$
$x^2=-1$ غ ق ق $\quad x^2=4 \rightsquigarrow (2,2)(-2,2)$

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