نیایش شاه‌نظری — تکلیف کد ۵ — یازدهم دهتری

①

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

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

$\Downarrow$

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

$x = 0$ $\quad 2^{1-x} - 1 \rightarrow x = 1$

	0		1	
−	⊥	+	⊥	−

$D_f = [0, 1]$

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②

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

$|x-2| - x \geq 0$

$|x-2| \geq x \rightarrow x - 2 \geq x \rightarrow -2 \geq 0$ ✗

$2 - x \geq x \rightarrow 2 \geq 2x$

$1 \geq x$

$\boxed{D_f = [1, +\infty)} \leftarrow$

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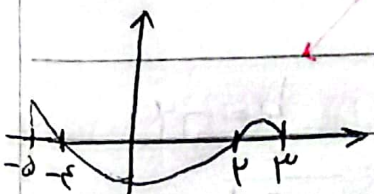
③

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



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

$x = 3, x = 2, x = -4$

-4		1		2		3
⊥	+	⊥	−	⊥	+	⊥

$D_f = [-5, 3]$ ①

② $D_y = (-4, 1] \cup (2, 3)$

① ∩ ② $\rightarrow \boxed{D_f = (-4, 1] \cup (2, 3)}$

موضوع:

تاریخ: / /

④

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

$$y_2 = \frac{1}{3x^2 + ax + b}$$

⑤

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

$$y = \sqrt{f(x) - f\left(\frac{4}{x}\right)} \Rightarrow x^3 + x - \frac{64}{x^3} - \frac{4}{x} \geq 0$$

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

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

$x=2$, $x=-2$

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

$x=0$

	-2	0	2	
	$-$	$\nexists$	$-$	$+$

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

⑥

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

$$f(2) + f(10) \qquad x = 2 \rightarrow f(10) = 2(10)^2 - 1 = 199$$

$$f(2) + f(10) = 199 + 1 = 200$$

⑦

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

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

$$\frac{g(\sqrt[3]{7} - 3)}{f(\sqrt[3]{2} + 1)} = \frac{(\sqrt[3]{7} - 3 + 3)^3 - 27}{(\sqrt[3]{2} + 1 - 2)^3 + 8} = \frac{-20}{10} = -2$$

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

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

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

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

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

$$14(x-4)$$

$$14x-56$$

$$2x+2\sqrt{x^2-14x+56}$$

$$2x+2\sqrt{(x-7)^2}=2x+2(x-7)=4x-14$$

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

$$\boxed{a=0}\ ,\ \boxed{b=2}\ ,\ \boxed{c=-4} \rightarrow \frac{a+b}{c}=\frac{2}{-4}=\boxed{\frac{-1}{2}}$$

$$f(x)=\frac{x+2}{x^2-4x+3}=\frac{x+2}{(x-1)(x-3)}\left\{(0,\tfrac{2}{3})(2,-\varepsilon)\right\}$$

$$g(x)=\left\{(2,1)\ ,\ (1,0)\ ,\ (\tfrac{5}{2},0)\ ,\ (0,2)\right\}$$

$$\frac{g}{f}\rightarrow\boxed{\left\{(2,-\tfrac{1}{2})\ ,\ (0,4)\right\}}$$

$$f(x)=\left\{(1,2)\ ,\ (\tfrac{5}{2},-1)\ ,\ (4,2)\ ,\ (-1,4)\right\}$$

$$g(x)=\left\{(-2,2)\ ,\ (1,-1)\ ,\ (\tfrac{5}{2},2)\ ,\ (-1,0)\right\}$$

ب) $f(2x)=\left\{(\tfrac{1}{2},2)\ ,\ (\tfrac{5}{4},-1)\ ,\ (2,2)\ ,\ (-\tfrac{1}{2},4)\right\}$

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

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

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