بنام خدا

نگار پارسی

یازدهم ریاضی (C) تکلیف شماره ۵

①

$y=\sqrt{x^{2}f(x+1)}\geq 0 \to x^{3}\geq 0$
$x\geq 0$

$f(x)=\left(\frac{1}{2}\right)^{x-2}-1=\left(\frac{1}{2}\right)^{x}\times\left(\frac{1}{2}\right)^{-2}-1=4\left(\frac{1}{2}\right)^{x}-1$

$f(x+1)=0$
$x=1$

$\boxed{D_f=[0,1]}$

②

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

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

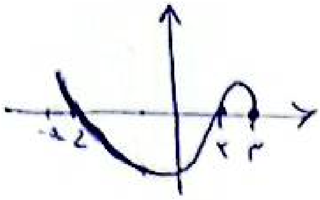
$x-2\geq x \to$ غق

$x-2\leq -x$

$2x\leq 2$

$x\leq 1$

$D_f=(-\infty,1]$



③

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

$-2 \quad 1 \quad 2 \quad 3$

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

④

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

$(3x^2+ax+b)(3x^2+cx+d)$

$y_2=\frac{1}{3x^2+ax+b}$ $\qquad \sqrt{-(a+b)}$

$9x^4-7x^2-4x-3=9x^4+3(a+c)x^3+(ac+3b+3d)x^2+(ad+bc)x+bd$

$a+c=0\to a=-c$

$ac+3b+3d=-7$

$-c^2+3b+3d=-7$

$ad+bc=-4$

$ad+ab=-4$

$a(d+b)=-4$

$c=1 \to a=-1$

$3b+3d=-6$

$b+d=4$

$-2b=-6\to b=-3$

$\sqrt{-(a+b)}$

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$\sqrt{-(-4)}=2$

⑤

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

$y=\sqrt{f(x)-f\left(\frac{4}{x}\right)}$

$y=\sqrt{x^3+x-\left(\frac{64}{x^3}\right)-\left(\frac{4}{x}\right)}=\sqrt{\frac{1}{x}(x^2-4)+\frac{1}{x^3}(x^6-64)}$

$\sqrt{\frac{1}{x}(x^2-4)+\frac{1}{x^3}(x^2-4)(x^4+16+4x^2)}=\sqrt{\frac{1}{x}(x^2-4)\left(1+\frac{1}{x^2}(x^4+16+4x^2)\right)}=$

$\sqrt{\frac{1}{x}(x^2-4)\underbrace{\left(1+x^2+\frac{16}{x^2}+4\right)}_{\text{همواره } \geq 0}}$

$-2 \quad 0 \quad 2$

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

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

$f(2) \xrightarrow{\text{اگر } x=1} f(1+1)=2(1)^2-1=1$

$f(10) \xrightarrow{\text{اگر } x=2} f(8+2)=2(2)^2-1=7$

$\boxed{f(2)+f(10)=1+7=8}$

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$f(x)=x^3-6x^2+12x=(x-2)^3+8 \qquad g(x)=x^3+9x^2+27x=(x+3)^3-27$

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

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

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

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

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

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

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$f(x)=\frac{x+2}{x^2-4x+3}$

$x^2-4x+3 \to \neq 0 \qquad (x-1)(x-3)\neq 0$

$D_f=\mathbb{R}-\{1,3\}$

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

$f(0)=\frac{2}{3} \qquad f(2)=\frac{4}{4-8+3}=-4$

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

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

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

ب) $f(x^2)=\{(\pm 1,2),(\pm\sqrt{3},-1)(\pm 2,2)\}\cancel{(-\sqrt{-1},6)}\}$

$x^2=-1$ غ ق ق

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

د) $\frac{2f}{g}=\{(1,-4)(3,-1)\}$