Date: / / Sat Sun Mon Tue Thu Wed Fri Subject:

ستایش تندرو   یازدهم ریاضی (پنجشنبه)   تکلیف شماره ۵

۱- دامنه؟ $y=\sqrt{x^3 f(x+1)}$ $f(x)=\left(\frac{1}{2}\right)^{x-2}-1$

$x^3 f(x+1)\geq 0$ $f(x+1)=\left(\frac{1}{2}\right)^{x-1}-1=2^{1-x}-1$

$\hookrightarrow x^3\left(2^{1-x}-1\right)\geq 0$ $D_f=[0,1]$

	0		1	
+	○	+	○	−

$x=0$ $\hookrightarrow 2^{1-x}=1 \Rightarrow 1-x=0 \Rightarrow x=1$

۲- $f(x)=\sqrt{x+|x+2|}$ $f(-x)=$ دامنه؟

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

	2	
$-x-x+2$		$-x+x-2$
$-2x+2$		-2 تعریف نشده

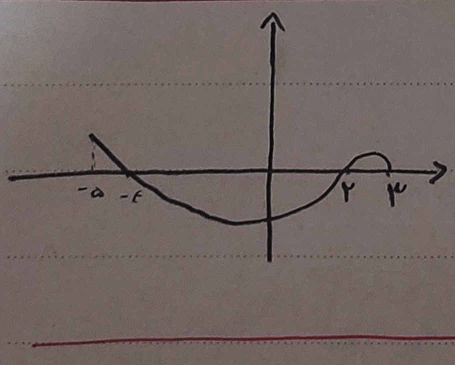
$-2x+2\geq 0$

$2(-x+1)\geq 0$ → 1

	1	
+	○	−

$D_f=(-\infty,1]$

۳-



$y=\sqrt{\frac{x-1}{f(x)}}$ $x-1\to x=1$, $f(x)\to x=-4,2,3$

	-4		1		2		3	
−	○	+	○	−	○	+	○	−

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

۴- $y_1=\frac{1}{9x^4-7x^2-4x-3}$ $y_2=\frac{1}{3x^2+ax+b}$ $\sqrt{-(a+b)}$

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

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

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

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

$\sqrt{-(-1-3)}=\sqrt{+4}=2$

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۵- $f(x)=x^3+2x \qquad y=\sqrt{f(x)-f\left(\frac{4}{x}\right)}$

$$y=\sqrt{x^3+2x-\frac{64}{x^3}-\frac{8}{x}}=\sqrt{\frac{1}{x^3}(x^6-64)+\frac{1}{x}(x^2-8)}$$

$$=\sqrt{\frac{1}{x^3}(x^2-4)(x^4+4x^2+16)+\frac{1}{x}(x^2-8)}=\sqrt{\frac{1}{x}(x^2-4)\left(x^2+\frac{16}{x^2}+5\right)}$$

$x=0$ ✓ $\quad x=\pm 2$ ✓ $\quad x^2+\frac{16}{x^2}+5>0$ همواره ⊕ ✓

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

	$-\infty$		-2		0		$+\infty$
	+	∄	−	0	+	∄	+

۶- $f(x^2+x)=2x^2-1 \qquad f(2)+f(10)\longrightarrow 1+7=8$

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

$x^2+x=10\longrightarrow x=2\longrightarrow f(10)=8-1=7$

۷- $f(x)=x^3-4x^2+12x+8=(x-2)^3+16 \qquad \frac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)}$

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

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

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

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

$f(x)+g(x)=a+b\sqrt{x+c}\longrightarrow \sqrt{x-4}+2+\sqrt{x-4}-2=2\sqrt{x-4}$

$\rightarrow a=0 \quad b=2 \quad c=-4$

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

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۹-

$f(x) = \frac{x+2}{x^2-5x+4} = \frac{x+2}{(x-1)(x-4)}$ $D_f = R - \{1, 4\}$

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

$\frac{g}{f} = \{(2, \frac{1}{-5})(0, \frac{3}{2})\} = \{(2, -\frac{1}{5})(0, \frac{3}{2})\}$

۱۰-

$f(x) = \{(1,2)(3,-1)(5,2)(-1,4)\}$

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

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

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

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

$\frac{2f}{g} = \{(1, -5)(3, -1)(-1, \frac{1}{0})\} = \{(1, -5)(3, -1)\}$

تعریف نشده