19,50

نام و نام خانوادگی ...هستی ملکی خواه... پاسخنامه تشریحی تکلیف شماره ..۵.. کلاس ..یازدهم (A)..

۱

~~$x^3 f(x+1) \geq 0$ $\quad f(x) = (\frac{+1}{2})^{x-2} \Rightarrow f(x+1) = (\frac{+1}{2})^{x+1-2} = (\frac{+1}{2})^{x-1}$ همواره مثبت~~

~~همواره مثبت $\Rightarrow x^3 \geq 0 \Rightarrow x \geq 0 \Rightarrow D: [0, +\infty)$~~

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

ریشه: $x^3 = 0$

$D: [0, 1]$

ریشه: $(\frac{1}{2})^{x-1} - 1 = 0 \to (\frac{1}{2})^{x-1} = 1 \to x - 1 = 0 \to x = 1$

x		0		1	
x^3	$-$	0	$+$		$+$
$f(x+1)$	$+$		$+$	0	$-$
	$-$	0	$+$	0	$-$

۲

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

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

$|2-x| \geq x \begin{cases} 2-x \geq x \to 2x \leq 2 \to x \leq 1 \to D_{f_1} = (-\infty, 1] \\ 2-x \leq -x \to 2 \leq 0 \text{ غ ق ق} \end{cases}$

۳

$A: \frac{x-1}{f(x)} \geq 0$

ریشه: $x - 1 = 0 \quad x = 1$

با توجه به شکل: $f(x) \begin{cases} -4 \\ 2 \\ 3 \end{cases}$

x	-5		-4		1		2		3
$x-1$		$-$		$-$	0	$+$		$+$	
$f(x)$		$+$	0	$-$		$-$	0	$+$	0
A		$-$		$+$	0	$-$		$+$	

$D: (-4, 1] \cup (2, 3)$

۴

$9x^4 - 7x^2 - 4x - 3 \neq 0$

$9x^4 - 6x^2 + 1 - x^2 - 4x - 4 \neq 0$

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

$|3x^2 - 1| \neq |x+2|$

$\begin{cases} 3x^2 - 1 \neq x + 2 \to 3x^2 - x - 3 \neq 0 \text{ مطابق سوال} \to a = -1, b = -3 \text{ ①} \\ -3x^2 + 1 \neq -x - 2 \to -3x^2 + x + 3 \neq 0 \; \times \\ 3x^2 - 1 \neq -x - 2 \to 3x^2 + x + 1 \neq 0 \text{ مطابق سوال} \to a = 1, b = 1 \text{ ②} \\ -3x^2 + 1 \neq x + 2 \to -3x^2 - x - 1 \neq 0 \; \times \end{cases}$

$\sqrt{-(a+b)} = \begin{cases} \text{①} \; \boxed{\sqrt{-(-3-1)} = \sqrt{-(-4)} = \sqrt{4} = 2} \\ \text{②} \; \sqrt{-(1+1)} = \sqrt{-2} \times \text{ غ ق ق} \end{cases}$

۵

$f(x) - f(\frac{4}{x}) \geq 0$

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

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

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

همواره مثبت $\Rightarrow \frac{x^2-4}{x} \geq 0$

$A = \frac{x^2 - 4}{x}$

ریشه: $\begin{cases} 0 \\ \pm 2 \end{cases}$

x		-2		0		2	
$x^2 - 4$	$+$	0	$-$		$-$	0	$+$
x	$-$		$-$	0	$+$		$+$
A	$-$	0	$+$	$\|$	$-$	0	$+$

$D: [-2, 0) \cup [2, +\infty)$

۶

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

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

$f(10):\quad x^3+x=10 \rightarrow x=2 \rightarrow 2x^2-1=2(2)^2-1=7$

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

۷

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

$f(\sqrt[3]{2}+2)=(\sqrt[3]{2}+2)((\sqrt[3]{2}-1)^2+3)=(\sqrt[3]{2}+2)(\sqrt[3]{4}-2\sqrt[3]{2}+4)=(\sqrt[3]{2})^3+2^3=2+8=10$

$g(x)=x^3+9x^2+27x=x(x^2+9x+27)=x((x+3)(x+6)+9)$

$g(\sqrt[3]{7}-3)=(\sqrt[3]{7}-3)((\sqrt[3]{7})(\sqrt[3]{7}+3)+9)=(\sqrt[3]{7}-3)(\sqrt[3]{49}+3\sqrt[3]{7}+9)=(\sqrt[3]{7})^3-(3)^3=7-27=-20$

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

۸

همواره مثبت

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

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

$f(x)+g(x)=\begin{cases}\sqrt{x-4}+2+\sqrt{x-4}-2=2\sqrt{x-4} & b=2\\ \sqrt{x-4}+2-\sqrt{x-4}+2=4 & \end{cases}$

برحسب x نیست — غ ق ق

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

$a+b\sqrt{x+c}=1\sqrt{x-4} \Rightarrow a=0,\ b=1,\ c=-4$ $\quad -\frac{1}{2} \leftarrow \boxed{\frac{a+b}{c}=\frac{-1}{4}}$

1,75

۹

$\frac{g}{f}:\ (2,\frac{1}{-4}),(1,\frac{0}{\times}),(3,\frac{5}{\times}),(0,\frac{4}{\frac{2}{3}})=\{(2,\frac{-1}{4}),(0,6)\}$

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

$\frac{2+2}{4-8+3}=\frac{4}{-1}=-4$ ✓ $\qquad \frac{3+2}{9-12+3}=\frac{5}{0}$ غ ق

$\frac{1+2}{1-4+3}=\frac{3}{0}$ غ ق $\qquad \frac{0+2}{(0)^2-4(0)+3}=\frac{2}{3}$ ✓

۱۰

1,5

$f(2x)\rightarrow 2x=k \quad x=\frac{k}{2} \qquad f(2x):\{(\frac{1}{2},2),(\frac{3}{2},-1),(\frac{4}{2},2),(\frac{-1}{2},6)\}$

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

$f(x^2)\rightarrow x^2=k \quad x=\sqrt{k}$

$f(x^2):\{(1,2),(\sqrt{3},-1),(2,2),\cancel{(\sqrt{-1},6)}\}$ غ ق ق

$2g^2(x)+1$

$\{(-2,2(3)^2+1),(1,2(-1)^2+1),(3,2(2)^2+1),(-1,2(0)^2+1)\}=\{(-2,19),(1,3),(3,9),(-1,1)\}$

غ ق ق

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

۱۰ ب) $x^2=1 \rightarrow x=\pm 1 \qquad x^2=-1 \rightarrow \times$

$x^2=3 \rightarrow x=\pm\sqrt{3}$

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

$\{(\pm 1,2)\ (\pm\sqrt{3},-1)\ (\pm 2,2)\}$