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

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

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

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

ریشه $\to 0$

$D:[0,1]$

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

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

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

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

$|2-x| \geq x \begin{cases} 2-x \geq x \to 2x \leq 2 \to x \leq 1 \to D_f=(-\infty,1] \\ 2-x \leq -x \to 2 \leq 0 \text{ غقق} \end{cases}$

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

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	$+$		$+$	
$f(x)$		$+$	$\nexists$	$-$		$-$	$\nexists$	$+$	$\nexists$
A		$-$	$\nexists$	$+$	0	$-$	$\nexists$	$+$	$\nexists$

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

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

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

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

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

$\begin{cases} 3x^2-1 \neq x+2 \to 3x^2-x-3 \neq 0 \ \text{مطابق فرض } y_2 \to a=-1,\ b=-3 \ (1) \\ -3x^2+1 \neq -x-2 \to -3x^2+x+3 \neq 0 \ \times \\ 3x^2-1 \neq -x-2 \to 3x^2+x+1 \neq 0 \ \text{مطابق فرض } y_2 \to a=1,\ b=1 \ (2) \\ -3x^2+1 \neq x+2 \to -3x^2-x-1 \neq 0 \ \times \end{cases}$

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

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$f(x)-f\left(\frac{4}{x}\right) \geq 0 \qquad A=\frac{x^2-4}{x}$

$x^3+x-\left(\frac{4}{x}\right)^3-\left(\frac{4}{x}\right) \geq 0$ ریشه $\begin{cases} 0 \\ -2 \\ 2 \end{cases}$

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

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

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

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

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

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

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

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

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

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

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

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

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

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همواره مثبت

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

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

$f(x)+g(x) = \begin{cases} \sqrt{x-4}+2+\sqrt{x-4}-2 = 1\sqrt{x-4} \\ \sqrt{x-4}+2-\sqrt{x-4}+2 = 4 \end{cases}$ برحسب x نیست غ ق ق

$a+b\sqrt{x+c} = 1\sqrt{x-4} \Rightarrow a=0,\ b=1,\ c=-4$

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

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

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

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

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

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

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

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

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

$2g^2(x)+1$

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

غ ق ق

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