

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره ۱۱۱... کلاس: (۵)

$$f(x) = \left(\frac{1}{x}\right)^{x-1} - 1 \quad y = \sqrt{x^x f(x+1)}$$

$$y = \sqrt{x^x \left(\left(\frac{1}{x+1}\right)^{x+1} - 1\right)} = \sqrt{\frac{x^x}{x^{x+1}} - x^x} \quad \frac{x^x}{x^{x+1}} - x^x \geq 0 \rightarrow x^x x^{1-x} - x^x \geq 0$$

$$\rightarrow x^x \left(\frac{1}{x} - 1\right) \geq 0 \rightarrow \frac{0}{-1} + \frac{1}{x} \geq 0 \quad D = [0, 1]$$

$$\frac{1}{x} = 1 \rightarrow -x+1=0 \rightarrow x=1$$

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

$$f(-x) = \sqrt{-x+|-x+2|} \rightarrow -x+|-x+2| \geq 0 \rightarrow \begin{cases} -x-x+2 \geq 0 & x \leq 1 \\ -x-x-2 \geq 0 & x \geq 2 \end{cases}$$

این کابل غلط است پس باز قرار

$$D = (-\infty, 1]$$

$$y = \sqrt{\frac{x-1}{f(x)}} \rightarrow \frac{x-1}{f(x)} \geq 0 \quad D = (-\infty, 1] \cup (2, \infty)$$

$$y = \frac{1}{9x^2 - 7x^2 - 6x - 3} \quad ① \quad 9x^2 - 7x^2 - 6x - 3 \rightarrow 9x^2 - 2x^2 = (3x^2 - x)(3x^2 + x)$$

$$\rightarrow (3x^2 - x + w)(3x^2 + x + z) \rightarrow 9x^4 + (3z + 3w - 1)x^3 + (-z + w)x^2 + wz = 9x^4 - 7x^2 - 6x - 3$$

$$\Rightarrow \begin{cases} 3z + 3w - 1 = 0 \\ -z + w = -6 \\ wz = -3 \end{cases} \rightarrow \begin{cases} z = 1, w = -2 \\ z = -1, w = 3 \end{cases}$$

$$\Rightarrow 3(-1 + z) + 3z - 1 = -6 \rightarrow z = -1$$

$$\sqrt{-(a+b)} = \sqrt{-(-6)} = \sqrt{6}$$

$$f(x) = x^x + x \quad y = \sqrt{f(x) - f\left(\frac{1}{x}\right)}$$

$$y = \sqrt{x^x + x - \frac{x^{\frac{1}{x}}}{\frac{1}{x}} - \frac{x}{\frac{1}{x}}} \rightarrow \frac{x^x + x^2 - x^{\frac{1}{x}+1} - x^2}{x^2} \geq 0$$

$$x^x + x^2 - x^{\frac{1}{x}+1} - x^2 \geq 0 \rightarrow x^x - x^{\frac{1}{x}+1} \geq 0 \rightarrow x^x \geq x^{\frac{1}{x}+1} \rightarrow x^x \geq x^{\frac{1}{x}} \cdot x \rightarrow x^{\frac{x-1}{x}} \geq x$$

$$\rightarrow x^{\frac{x-1}{x}} \geq x \rightarrow x^{\frac{x-1}{x}} \geq x^1 \rightarrow \frac{x-1}{x} \geq 1 \rightarrow x-1 \geq x \rightarrow -1 \geq 0$$

$$D = [-1, 0) \cup (2, \infty)$$

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

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

$$x^2+x = 1 \rightarrow x=2 \rightarrow f(1) = 1-1=0$$

$$f(2)+f(1) = 1+0 = 1$$

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$$f(x) = x^3 - 4x^2 + 12x \quad (x-2)^3 = x^3 - 4x^2 + 12x - 8 \rightarrow f(x) = (x-2)^3 + 8$$

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

$$\frac{g(\sqrt{5}-2)}{f(\sqrt{5}+2)} = \frac{(\sqrt{5}-2+3)^3 - 27}{(\sqrt{5}+2-2)^3 + 8} = \frac{(\sqrt{5}-1)^3 - 27}{(\sqrt{5})^3 + 8} = \frac{-2}{1} = -2$$

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

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

$$\Rightarrow (f(x)+g(x))^2 = 2x + 2\sqrt{x^2-4c} \xrightarrow{\text{بـ}} f(x)+g(x) = \sqrt{2x+2\sqrt{x^2-4c}}$$

$$\rightarrow f(x)+g(x) = \sqrt{2x+2\sqrt{x^2-4c}} = a+b\sqrt{x+c} \Rightarrow \begin{cases} a=0 \\ b=2 \\ c=-4 \end{cases}$$

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

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$$f(x) = \frac{x+2}{x^2-6x+3} \quad g(x) = \{(2,1), (1,0), (3,4), (0,0)\}$$

$$f(x) = \{(2,-4), (1, -5), (3, -1), (0, \frac{2}{3})\}$$

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

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الف) $f(2x) \rightarrow$ مقصوره

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

ب) $f(x^2) \rightarrow$ مقصوره

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

ج) $2g^2(x)+1 \rightarrow$ مقصوره

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

د) $\frac{2f}{g} \rightarrow$ مقصوره

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

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