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آیة کریم زاد - تطیف - یازدهم اختر B

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

$$y = \sqrt{x^x f(x+1)} = \sqrt{x^x \left(\left(\frac{1}{x+1}\right)^{x-1}\right)} \gg 0$$

$x=0$

$$x^{x-1} - 1 = 0 \rightarrow x=1$$

$$x^{1-x} - x^0 = 0 \rightarrow 1-x > 0 \rightarrow 1 > x$$

$$\begin{array}{c} 0 & 1 \\ - & + \\ 0 & 0 \end{array}$$

$$D_f = [0, 1]$$

سوال 1

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$$f(x) = \sqrt{x + |x+1|}$$

$$f(-x) = \sqrt{-x + |1-x|} \gg 0 \rightarrow |1-x| \gg x^2 \rightarrow x^2 - 2x + 1 \gg x^2 \rightarrow -2x + 1 \gg 0$$

$$\begin{array}{c} 1 \\ + & - \\ 0 & 0 \end{array}$$

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

سوال 2

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

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

$$D_y = [-1, 1] \cup (2, 3)$$

سوال 3

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$$y_1 = \frac{1}{9x^2 - 6x - 1}$$

$$9x^2 - 6x - 1 \rightarrow 9x^2 - 6x + 1 - (x^2 + 2x + 1) = (3x^2 - 1)^2 - (x+1)^2 = (3x^2 - 1 - x - 1)(3x^2 - 1 + x + 1)$$

$$\rightarrow \underbrace{(3x^2 - x - 2)}_{y_2, y_3} \underbrace{(3x^2 + x + 1)}_{\Delta < 0}$$

$$y_2 = \frac{1}{3x^2 + ax + b} = \frac{1}{3x^2 - x - 2} \Rightarrow \begin{cases} a = -1 \\ b = -2 \end{cases}$$

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

سوال 4

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

$$y = \sqrt{f(x) - f\left(\frac{x}{2}\right)} = \sqrt{x^x + x - \frac{x^x}{2} - \frac{x}{2}} \gg 0 \rightarrow x^x - \frac{x^x}{2} + x - \frac{x}{2} = \left(x - \frac{x}{2}\right) \left(x^x + x + \frac{14}{2x}\right) + \left(x - \frac{x}{2}\right) =$$

$$\begin{array}{c} -2 & 0 & 2 \\ - & + & - \\ 0 & 0 & 0 \end{array} \left(\frac{x^x - x}{x} \right) \left(x^x + x + \frac{14}{2x} \right)$$

$$D_y = [-1, 0] \cup [2, +\infty)$$

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

$$\rightarrow f(10) + f(2) =$$

$$10 - 1 + 2 - 1 = \boxed{10}$$

سوال 5

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$$x^x + x = 2 \rightarrow x = 1$$

$$x^x + x = 10 \rightarrow x = 2$$

$$f(x) = x^2 - 4x^2 + 12x + 1 - 1 \rightarrow (x-2)^2 + 1$$

$$g(x) = x^2 + 9x^2 + 12x + 1 - 1 \rightarrow (x+3)^2 - 1$$

آسان ترین (0) - تطبیق سوال

$$\frac{(2\sqrt{17} - 3 + 3) - 17}{(3\sqrt{17} + 2 - 2) + 1} = \boxed{-2}$$

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

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

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

$$\begin{cases} \text{if } x > 4 & \sqrt{x-4} - 2 \quad \checkmark \\ \text{if } x < 4 & 2 - \sqrt{x-4} \end{cases}$$

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

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

$$\frac{g}{f} \neq 0 \rightarrow x \neq 1, 2, -2$$

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

$$\Rightarrow \frac{g}{f} = \int (x, \frac{1}{-1}) (1, \frac{0}{0}) (x, \frac{2}{-1}) (0, \frac{2}{-1})$$

$$\Rightarrow \int (x, -\frac{1}{2}) (0, 1)$$

$$f(x) = \int (1, 2)(x, -1)(x, 1)(-1, 4)$$

$$g(x) = \int (-2, 2)(1, -1)(x, 2)(-1, 0)$$

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

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

$$c) xg'(x) + 1 = \int (-2, 1)(1, 2)(x, 2)(-1, 1)$$

$$d) \frac{x}{g} = \int (1, \frac{x}{-1}) (1, \frac{1}{-1}) = \int (1, -x), (x, -1)$$