

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

آباز كتریم زاده - 0 - تطبیق - بازدهم (ضریب B)

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

$$\frac{0}{-} \frac{1}{+} \frac{0}{-}$$

$$D_f = [0, 1]$$

(سوال 1)

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

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

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

(سوال 2)

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

$$\frac{1}{+} \frac{1}{-}$$

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

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

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

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

(سوال 3)

$$y_1 = \frac{1}{9x^2 - 6x - 1} \rightarrow 9x^2 - 6x + 1 - (x^2 + 4x + 4) = (3x^2 - 1) - (x+2) = (3x^2 - 1 - x - 2)(3x^2 - 1 + x + 2)$$

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

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

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

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

(سوال 4)

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

$$\frac{-2 \quad 0 \quad 2}{- \quad + \quad - \quad +} \left(\frac{x^x - x}{2}\right) \left(x^x + x + \frac{x^x}{2}\right) \quad D_y = [-2, 0] \cup [2, +\infty)$$

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

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

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

(سوال 5)

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

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

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

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

آسان ترین (0) - تعیین سوال

$$\frac{(2\sqrt{17-13+13})-17}{(\sqrt{17+13-13})+1} = \boxed{-2}$$

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

$$g(x) = \sqrt{x-1}\sqrt{x-1} = \sqrt{(\sqrt{x-1}-1)^2} = |\sqrt{x-1}-1|$$

$$\begin{cases} f(x)+g(x) = a+b\sqrt{x+c} \\ \sqrt{x-1}+1+\sqrt{x-1}-1 = 0+1\sqrt{x-1} \\ \downarrow \quad \downarrow \quad \downarrow \\ a \quad b \quad c \end{cases}$$

$$\begin{cases} \text{if } x \geq 1 & \sqrt{x-1}-1 \quad \checkmark \\ \text{if } x < 1 & 1-\sqrt{x-1} \end{cases}$$

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

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

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

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

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

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

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

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

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

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

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

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