

«نزهة الراحى» «باز هم دفتر» «نصف ۹»

$$f(x) = \begin{cases} \cot \frac{\pi x}{\varepsilon}, & x < 1 \rightarrow \cot \frac{\pi \times \frac{1}{\varepsilon}}{\varepsilon} = \cot \frac{\pi}{\varepsilon} = \sqrt{3} \\ \sqrt{x^2 + 1}, & x > 1 \rightarrow f(\sqrt{3}) = \sqrt{(\sqrt{3})^2 + 1} = 2 \end{cases}$$

$f(f(\frac{1}{\varepsilon})) = 2$

$$f\left(\frac{1}{x}\right) = \sqrt{\frac{x-1}{x^2}} \rightarrow f\left(\frac{1}{\frac{1}{\varepsilon}}\right) = f(\varepsilon) = \sqrt{\frac{\varepsilon-1}{\varepsilon^2}} = \frac{\sqrt{\varepsilon-1}}{\varepsilon}$$

$$g(x) = 2 \cos^2 x \rightarrow g\left(\frac{\pi}{\varepsilon}\right) = 2 \cos^2 \frac{\pi}{\varepsilon} = 2 \times \left(\frac{1}{\varepsilon}\right)^2 = \frac{1}{\varepsilon}$$

$$f\left(g\left(\frac{\pi}{\varepsilon}\right)\right) = \frac{\sqrt{\varepsilon}}{\varepsilon}$$

$$f(x) = [x] \quad g(x) = \frac{x}{1-x} \quad f(g(\sqrt{2})) = -4$$

$$g(\sqrt{2}) = \frac{\sqrt{2}}{1-\sqrt{2}} \times \frac{1+\sqrt{2}}{1+\sqrt{2}} = -\sqrt{2}-2 \rightarrow f(-\sqrt{2}-2) = [-\sqrt{2}-2] = -4$$

$$f(x) = \sin x \quad g(x) = x \sqrt{1-x^2} \quad g\left(f\left(\frac{\pi}{\varepsilon}\right)\right) =$$

$$f\left(\frac{\pi}{\varepsilon}\right) = \sin \frac{\pi}{\varepsilon} = \frac{\sqrt{2}}{\varepsilon} \quad g\left(\frac{\sqrt{2}}{\varepsilon}\right) = \frac{\sqrt{2}}{\varepsilon} \sqrt{1 - \frac{2}{\varepsilon^2}} = \frac{\sqrt{2}}{\varepsilon} \times \frac{1}{\sqrt{\varepsilon}} = \frac{1}{\varepsilon}$$

$$f(x) = \{(\varepsilon, \omega), (4, \omega), (1, 12), (10, 12) \}$$

$$g(x) = \{(\varepsilon, 4), (2, 4), (4, 1), (1, 1) \}$$

$$f \circ g(x) = \{(\varepsilon, \omega), (2, \omega), (4, 12), (1, 12) \}$$

$$g \circ f(x) = \emptyset$$

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$$g \circ g(x) = \{(\varepsilon, 1), (2, 4), (4, 1) \}$$

$$(\varepsilon, 2) \in f \circ g \rightarrow f(g(\varepsilon)) = 2 \rightarrow g(\varepsilon) = 4 \rightarrow a = \varepsilon$$

$$(\varepsilon, 1) \in g \circ f \rightarrow g(f(\varepsilon)) = 1 \rightarrow f(\varepsilon) = \omega, g(\omega) = 1 \rightarrow b = \omega$$

$$(a, b) = (\varepsilon, \omega)$$

$$f(f(x)) = 5x+1, \quad g(2x+3) = 3x-2, \quad g \circ f(-1) = ? \quad -9$$

$a(ax+b)+b \rightarrow ax^2 + (ab+b) = 5x+1 \rightarrow a=1, b=1 \rightarrow 2x+1$
 $a=-2, b=-3 \rightarrow -2x-3$

$$g \circ f(-1) \rightarrow \begin{cases} \frac{1}{-2} (2x+1) - \frac{1}{-2} \rightarrow -1 \\ \frac{1}{-2} (-2x-3) - \frac{1}{-2} \rightarrow -1 \end{cases} \quad g \circ f(-1) = -1$$

$$f(x) = \sqrt{x+1}, \quad g(x) = \frac{1}{x^2-5x}, \quad D_{g \circ f} = ? \quad -7$$

$$\frac{1}{(\sqrt{x+1})(\sqrt{x+1}-5)} \rightarrow \frac{1}{-1} \rightarrow D_{g \circ f} = (-\infty, +\infty) - \{1\}$$

$$f(x) = \sqrt{1-x^2}, \quad g(x) = \sqrt{x}, \quad (f+g) \circ f = ? \quad -1$$

$$\sqrt{x} + \sqrt{1-x^2} \rightarrow \sqrt{x^2} + \sqrt{1-x^2} \rightarrow \frac{-1}{-1+1} \rightarrow [-1, 1]$$

$$a) f\left(\frac{3x+1}{x-2}\right) = 2x+5 \rightarrow \frac{3x+1}{x-2} = t \quad -9$$

$$t = \frac{3x+1}{x-2} \rightarrow t(x-2) = 3x+1 \rightarrow tx - 2t = 3x+1 \rightarrow x(t-3) = 1+2t \rightarrow x = \frac{1+2t}{t-3}$$

$$f\left(\frac{3x+1}{x-2}\right) = 2\left(\frac{1+2t}{t-3}\right) + 5 \rightarrow f(t) = \frac{1(t-1)}{t-3} \rightarrow f(x) = \frac{1(x-1)}{x-3}$$

$$b) f\left(x + \frac{1}{x}\right) = x^2 + \frac{1}{x^2} \rightarrow f(t) = t^2 - 2t$$

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

$$f(x) = x\sqrt{x} \quad / \quad \text{مناطق تعریف: } (2\sqrt{2}, 0), (1, 0)$$

مناطق تعریف

مناطق تعریف

$$y = 1 \text{ و } 1$$

$$x\sqrt{x+1} = x^2$$

$$\begin{cases} f(x) = 1 \\ f(x) = \sqrt{x} \end{cases}$$

$$x\sqrt{x} = \sqrt{x}$$

$$x = 1$$