

$$f(x) = \begin{cases} \cot \frac{\pi x}{4} & ; x \leq 1 \\ \sqrt{x+1} & ; x > 1 \end{cases}$$

$$f \circ f\left(\frac{1}{3}\right) = \rightarrow f\left(f\left(\frac{1}{3}\right)\right) = f\left(\cot \pi \left(\frac{1}{3}\right)\right) = f\left(\frac{\sqrt{3}}{3}\right) = f(\sqrt{3}) = \textcircled{2} \rightarrow \text{پاسخ}$$

$$f\left(\frac{1}{x}\right) = \sqrt{\frac{x-1}{x^2}}, \quad g(x) = \sqrt{\cos x} \rightarrow f \circ g\left(\frac{\pi}{3}\right) = f\left(g\left(\frac{\pi}{3}\right)\right) = f\left(\frac{1}{2}\right)$$

$$f = \sqrt{1 - \frac{1}{4}} = \textcircled{\frac{\sqrt{3}}{2}}$$

$$f(x) = [x], \quad g(x) = \frac{x}{1-x}, \quad f \circ g(\sqrt{2}) = ? \rightarrow f\left(g(\sqrt{2})\right) = f\left(\frac{\sqrt{2}}{1-\sqrt{2}}\right) = f\left(\frac{\sqrt{2}(1+\sqrt{2})}{1-2}\right) = f(-\sqrt{2}-2) = \textcircled{-4}$$

$$f(x) = \sin x$$

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

$$g \circ f\left(\frac{\pi}{4}\right) = g\left(f\left(\frac{\pi}{4}\right)\right) \rightarrow \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} \rightarrow g\left(\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{2}}{2} \sqrt{1 - \frac{1}{2}} = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \textcircled{\frac{1}{2}}$$

$$f(x) = \{(1,2), (2,1), (3,4), (4,3)\} / g(x) = \{(1,2), (2,1), (3,4), (4,3)\}$$

$$f \circ g(x) \rightarrow f(g(x)) = \{(1,2), (2,1), (3,4), (4,3)\}$$

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

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$$f = \{(1,2), (2,1), (3,4), (4,3)\} \rightarrow (a,b) = \textcircled{(1,2)}$$

$$g = \{(1,2), (2,1), (3,4), (4,3)\}$$

$$(1,2) \in f \circ g / (1,2) \in g \circ f \rightarrow g(f(x)) = \{(1,2), (2,1)\} \rightarrow \textcircled{b=2}$$

$$f(g(x)) = \{(1,2), (2,1), (3,4), (4,3)\} \rightarrow \textcircled{a=1}$$

$$a = \pm 2$$

$$a' = 1$$

$$f(f(x)) = 1x + 3 \rightarrow (ax+b)a+b \rightarrow ax+ba+b = 1x+3 \rightarrow \begin{cases} a=1 \\ b=3 \end{cases} \rightarrow 1x+3$$

$$g(1x+3) = 1x - 1 \rightarrow (1x+3)a' + b' = 1x - 1 \rightarrow \begin{cases} a'=1 \\ b'=-4 \end{cases}$$

$$g \circ f(-1) = ? \rightarrow g(f(-1)) = g(-1) \rightarrow (1/2)(-1) - 4/2 = -1/2 - 4/2 = -5/2$$

$$f(x) = \sqrt{x+1} \rightarrow \mathbb{R}$$

$$g(x) = \frac{1}{x^2 - 1} \rightarrow \mathbb{R} - \{0, 1\}$$

$$g \circ f = ? \rightarrow \{x \in D_f, f(x) \in D_g\} \rightarrow \mathbb{R} - \{0, 1\}$$

$$f(x) = \sqrt{1-x^2} \rightarrow 1-x^2 \geq 0 \rightarrow 1 \geq x^2 \rightarrow x \in [-1, 1]$$

$$g(x) = \sqrt{x} \rightarrow x \geq 0$$

$$(f+g) \circ f \rightarrow [1, 0]$$

$$f\left(\frac{13x+1}{x-3}\right) = 1x+2 \rightarrow f(t) = \frac{13t-11}{t-3} = \frac{13t-11}{t-3} = f(t) \rightarrow f(x) = \frac{13x-11}{x-3}$$

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

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

$$f(x) = x\sqrt{x}$$

$$g \circ f(x) = ? \rightarrow x \in D_f, f(x) \in D_g \rightarrow g \circ f(x) = 0 \rightarrow g(f(x)) = 0 \rightarrow f(x) = 1 \rightarrow x = 1$$

$$g(x) = 2\sqrt{x} \rightarrow x = 4$$