

N/25

$$f(x) = \begin{cases} \cot + \frac{n}{x} & ; n \leq 1 \\ \sqrt{n^2+1} & ; n > 1 \end{cases}$$

$$f \circ f\left(\frac{1}{\sqrt{2}}\right) = ?$$

(1, 75)

$$f\left(\frac{1}{\sqrt{2}}\right) \rightarrow \cot + \frac{1}{\sqrt{2}} \rightarrow \cot + \frac{1}{\sqrt{2}} \rightarrow \cot + \frac{1}{\sqrt{2}} \rightarrow \sqrt{\frac{1}{2} + 1} = \sqrt{\frac{3}{2}} \rightarrow \sqrt{\frac{3}{2} + 1} \rightarrow \sqrt{\frac{5}{2}}$$

دقت!

(2)

$$f \circ g\left(\frac{1}{\sqrt{2}}\right) = ? \quad g(x) = x \cos^2 \frac{1}{x} \quad \text{و} \quad f\left(\frac{1}{x}\right) = \sqrt{\frac{x^2-1}{x^2}}$$

(1, 75)

$$f \circ g(\sqrt{2}) = ?$$

$$-\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$g(x) = \frac{x}{1-x} \quad \text{و} \quad f(x) = [x]$$

(2)

$$\frac{\sqrt{2}}{1-\sqrt{2}} \rightarrow f \rightarrow \left[\frac{\sqrt{2}}{1-\sqrt{2}} \right] = -1$$

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

(1, 75)

$$\sin \frac{\pi}{2} \rightarrow \sqrt{1-\left(\frac{\pi}{2}\right)^2}$$

$$\frac{\sqrt{2}}{2} \sqrt{1-\left(\frac{\pi}{2}\right)^2} \rightarrow \frac{\sqrt{2}}{2} \sqrt{1-\frac{\pi^2}{4}} \rightarrow \frac{\sqrt{2}}{2} \sqrt{1-\frac{\pi^2}{4}} \rightarrow \frac{\sqrt{2}}{2} \sqrt{1-\frac{\pi^2}{4}}$$

دقت!

$$f(x) = \{(x, 0), (0, 0), (1, 1), (1, 2)\} \quad g(x) = \{(x, 0), (2, 0), (3, 1), (1, 1)\}$$

(2)

$$f \circ g(x) = \{(x, 0), (2, 0), (3, 1), (1, 1)\}$$

$$g \circ f(x) = \{(x, 0), (2, 0), (3, 1), (1, 1)\}$$

$$g \circ g(x) = \{(x, 0), (2, 0), (3, 1), (1, 1)\}$$

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

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

(2)

$$(4, 2) \in f \circ g \quad (2, 1) \in g \circ f \quad (4, 1) \in f$$

$$f \circ g = \{(1, 1), (3, 2), (4, 0), (2, 1)\} \quad g \circ f = \{(1, 2), (2, 1), (3, 2), (4, 1)\}$$

$$a = 2$$

$$b = 1$$

$$(4, 0)$$

$$f(f(n)) = \varepsilon n + 3 \quad g(2n+3) = 3n-2 \quad g \circ f(-1)$$

(۲)

$$n = -1 \rightarrow f(f(-1)) \rightarrow -1(\varepsilon) + 3 \neq -1 \rightarrow -1 \rightarrow n = -2 \rightarrow g(-1) = -8 \checkmark$$

$$f(n) = \sqrt{n+|n|} \geq 0 \quad g(n) = \frac{1}{n^2 - 9n}$$

$$D_{g \circ f} = (0, +\infty) - \{9\}$$

(۱, ۵)

$$D_{g \circ f} \Rightarrow n \in D_f ; f(n) \in D_g$$

$$n \in \mathbb{R} ; \sqrt{n+|n|} \in \mathbb{R} - \{0, 9\}$$

$$\sqrt{n+|n|} \neq 0 \rightarrow n > 0$$

$$\sqrt{n+|n|} \neq 9 \rightarrow n \neq 81$$

$$n \geq 0, \sqrt{2n} \geq 0 \rightarrow [0, +\infty)$$

$$n < 0, \sqrt{0} = 0$$

$$f(n) = \sqrt{1-n^2} \geq 0 \quad g(n) = \sqrt{n} \geq 0$$

$$D_{(f+g)} = [0, 1] \checkmark$$

$$\Rightarrow [0, 1] : \text{جواب}$$

(۱, ۵)

$$D_{(f+g)} \Rightarrow n \in D_f ; f(n) \in D_{(f+g)}$$

$$\checkmark n \in [-1, 1] ; \sqrt{1-n^2} \leq 1$$

همواره برقرار است

همواره برقرار است

$$f\left(\frac{n+1}{n-2}\right) = \varepsilon n + d \rightarrow \frac{n+1}{n-2} = t \rightarrow n+1 = t(n-2) \rightarrow n+1 = tn-2t \rightarrow n-tn = -2t-1$$

(۲)

$$n(1-t) = -1-2t \rightarrow n = \frac{-1-2t}{1-t} \rightarrow f(t) = \varepsilon\left(\frac{-1-2t}{1-t}\right) + d$$

$$f(n) = \varepsilon\left(\frac{-1-2n}{1-n}\right) + d \checkmark$$

$$f\left(n + \frac{1}{n}\right) = n^3 + \frac{1}{n^3} \rightarrow n + \frac{1}{n} = t \rightarrow \left(n + \frac{1}{n}\right)^3 = n^3 + 3n + \frac{3}{n} + \frac{1}{n^3}$$

رفت!

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

$$g(f(n)) \Rightarrow g(1) = 0 \quad g(16) = 0$$

(۲)

$$f(n) = 1 \rightarrow n\sqrt{n} = 1 \rightarrow n = 1$$

$$1-1 = 0 \checkmark$$