

سارنيا اسٹلنی - یازدهم ریاضه C - شما، ده تعلیم 9

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

$$f \circ f\left(\frac{1}{K}\right) = \textcircled{2}$$

$$\cot \frac{\pi}{K} = \frac{\pi}{4} \rightarrow \sqrt{K}$$

$$\sqrt{(\sqrt{K})^2 + 1} = \sqrt{K} = \textcircled{2}$$

$$f \circ g\left(\frac{\pi}{K}\right) = ?$$

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

$$g\left(\frac{\pi}{K}\right) = 2\left(\frac{1}{K}\right)^2 = 2 \times \frac{1}{K} = \frac{1}{K}$$

$$f\left(\frac{1}{K}\right) = \sqrt{\frac{K-1}{K}} = \sqrt{\frac{K}{K}}$$

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

$$f \circ g(\sqrt{K}) = ? \quad g(x) = \frac{x}{1-x}, \quad f(x) = [x] \quad (\text{ب})$$

$$g(\sqrt{K}) = \frac{\sqrt{K}}{1-\sqrt{K}} \times \frac{(1+\sqrt{K})}{(1+\sqrt{K})} = \frac{\sqrt{K} + K}{1-K} = -\sqrt{K} - K$$

$$f(-\sqrt{K} - K) = [-\sqrt{K} - K] = \underbrace{[-\sqrt{K}] - K}_{-K} = \textcircled{-K}$$

$$f \circ g(\sqrt{K}) = \textcircled{-K}$$

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

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

$$g \circ f\left(\frac{\pi}{K}\right) = \left(\frac{1}{K}\right)$$

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

$$g\left(\frac{\sqrt{K}}{K}\right) = \frac{\sqrt{K}}{K} \times \sqrt{1 - \frac{K}{K}} = \frac{\sqrt{K}}{K} \times \frac{\sqrt{K}}{K} = \frac{K}{K} = \frac{1}{K}$$

$$g(x) = \{(x, 4), (x, x), (4, 1), (1, 0)\} \quad (K)$$

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

$$a) f \circ g(x) \rightarrow \{(x, \Delta), (x, \Delta), (4, 12), (1, 12)\}$$

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

$$2) f \circ f(x) \rightarrow \emptyset$$

$$1) g \circ g(x) \rightarrow \{(x, 1), (x, 4), (4, 0)\}$$

$$f = \{(x, 1), (x, x), (x, \Delta), (1, v)\} \quad (A)$$

$$g = \{(1, x), (x, 1), (a, x), (b, 1)\}$$

$$(x, x) \in f \circ g \quad \boxed{x = a} \rightarrow x \rightarrow x$$

$$(x, 1) \in g \circ f \quad x \rightarrow \Delta \rightarrow 1$$

$$(a, b) \rightarrow (x, \Delta) \quad \boxed{b = \Delta} \leftarrow$$

$$g(x_2 + x) = x_2 - x$$

$$f(f(x)) = x_2 + x$$

$$x_2 + x = -1$$

$$x_2 = -x \rightarrow \boxed{x = -x} \quad (4)$$

$$g \circ f(-1) = ? \Rightarrow$$

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

$$\rightarrow g(-1) = x(-1) - x = \boxed{-1}$$

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

$$f(x) = ax + b \rightarrow f \circ f = a(ax + b) + b = a^2x + ab + b = x_2 + x$$

$$a^2 = x$$

$$\boxed{a = \pm x}$$

$$ab + b = x$$

$$a = x \Rightarrow x b = x \rightarrow \boxed{b = 1}$$

$$a = -x \Rightarrow -b = x \rightarrow \boxed{b = -x}$$

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

$$D_f \rightarrow x+|x| \geq 0$$

$$x+|x| \geq 0 \rightarrow D_f = \mathbb{R}_f$$

$$\sqrt{x+|x|} \neq 0$$

$$D_g \Rightarrow x^2 - 1 \neq 0 \quad x(x-1) \neq 0$$

$$x+|x| \neq 1$$

$$D_g = \mathbb{R} - \{0, 1\}$$

$$\rightarrow x \neq 1$$

$$\therefore f(x) \in D_g$$

$$D_{g \circ f} = (0, +\infty) - \{1\}$$

$$f(x) \neq 0, 1$$

$$\rightarrow x \neq \mathbb{R}^-, 0, 1$$

$$\{x \in D_f \mid f(x) \in D_g\}$$

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

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

$$D_f \rightarrow 1-x^2 \geq 0$$

(A)

$$D(f+g) \circ f = [-1, 1]$$

$$\nexists R_f \in [-1, 1]$$

$$1 \geq x^2$$

$$R_f = [0, 1]$$

$$-1 \leq x \leq 1 \rightarrow D_f = [-1, 1]$$

$$R_f \Rightarrow y = 1-x^2 \Rightarrow x^2 = 1-y \rightarrow 1-y \geq 0 \rightarrow y \leq 1$$

$$D_g = x \geq 0 \rightarrow [0, +\infty)$$

$$D_{f+g} = D_f \cap D_g = [-1, 1] \cap [0, +\infty) = [-1, 1] \rightarrow R_f \subseteq [-1, 1]$$

$$D(f+g) \circ f = \{x \in D_f \mid f(x) \in D_{f+g}\}$$

$$a) f\left(\frac{rx+1}{x-r}\right) = rx+d$$

(9)

$$\frac{rx+1}{x-r} = t \rightarrow x = \frac{-(-rt-1)}{+t-r} = \frac{+rt+1}{t-r}$$

$$f(t) = r\left(\frac{rt+1}{t-r}\right) + d = \frac{r+rt+d-t-d}{t-r} = \frac{rt-1}{t-r} \rightarrow f(x) = \frac{rx-1}{x-r}$$

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

$$f(t) = t^2 - rt \rightarrow f(x) = x^2 - rx$$

$$x + \frac{1}{x} = t \rightarrow \left(x + \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} + rx + \frac{r}{x}$$

$$\rightarrow \left(x + \frac{1}{x}\right)^2 - r\left(x + \frac{1}{x}\right)$$

Scanned with

$$f(x) = x\sqrt{2}$$

$$g(f(x))$$

(10)

$$\text{if } x=1, \sqrt{2} \Rightarrow g(x)=0$$

$$f(x)=1 \rightarrow x\sqrt{2}=1 \rightarrow \boxed{x=1}$$

$$f(x)=\sqrt{2} \rightarrow x\sqrt{2}=\sqrt{2} \rightarrow \boxed{x=1}$$