

$$f(x) = \begin{cases} \cot \frac{\pi}{\varepsilon} x & ; x < 1 \rightarrow \frac{1}{\sqrt{3}} \times \frac{\pi}{\varepsilon} = \frac{\pi}{4} \Rightarrow \cot \frac{\pi}{4} = \sqrt{3} \\ \sqrt{x^2 + 1} & ; x > 1 \xrightarrow{\sqrt{3}} \sqrt{3+1} = \boxed{2} \end{cases}$$

$$f\left(\frac{1}{\sqrt{3}}\right) = \underline{2}$$

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

$$g(x) = x \cos^2 x$$

$$\hookrightarrow x \times \cos^2\left(\frac{\pi}{\sqrt{3}}\right) = \frac{1}{\sqrt{3}}$$

$$f\left(\frac{1}{\sqrt{3}}\right) = ?$$

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

$$f(x) = [x]$$

$$g(x) = \frac{a}{1-x}$$

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

$$\sqrt{x} \sim 1,4$$

$$\hookrightarrow \frac{\sqrt{x}}{1-\sqrt{x}} \Rightarrow \left[\frac{\sqrt{x}}{1-\sqrt{x}} \right] = \left[\frac{1,4}{1-1,4} \right] = \left[\frac{1,4}{-0,4} \right]$$

$$= [-3,5] = \boxed{-4}$$

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

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

$$f(x) = \{(x, 8)(4, 8)(1, 12)(10, 12)\}$$

$$g(x) = \{(x, 4)(2, 8)(9, 1)(10, 10)\}$$

$$1) \quad f \circ g(x) = \{(x, 8)(2, 8)(9, 12)(10, 12)\}$$

g	f
$x \rightarrow 4$	$x \rightarrow 8$
$2 \rightarrow 8$	$4 \rightarrow 8$
$4 \rightarrow 1$	$1 \rightarrow 12$
$10 \rightarrow 10$	$10 \rightarrow 12$

$$2) \quad g \circ f(x) = \emptyset \quad 3) \quad f \circ f(x) = \{(x, 1)(2, 4)(9, 10)\}$$

$$4) \quad g \circ g(x) = \emptyset$$

$$f = \{(x, 1)(2, 2)(8, 8)(10, 10)\}$$

$$g = \{(1, 2)(2, 1)(a, 2)(b, 1)\}$$

f	g
$x \rightarrow 1$	$1 \rightarrow 2$
$2 \rightarrow 2$	$2 \rightarrow 1$
$8 \rightarrow 8$	$a \rightarrow 2$
$10 \rightarrow 10$	$b \rightarrow 1$

$$(x, 2) \in f \circ g \rightarrow a \rightarrow 2 \rightarrow 2 \Rightarrow a = x$$

$$(2, 1) \in g \circ f \rightarrow x \rightarrow 1 \rightarrow 1 \Rightarrow b = 2 \Rightarrow (a, b) = (x, 2)$$

$$f(f(x)) = 7x + 1 \rightarrow f(x) = ax + b \quad (4)$$

$$g(7x + 1) = 7x - 1 \rightarrow g(x) = cx + d \quad (5)$$

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

$$\rightarrow a(ax + b) + b = 7x + 1$$

$$\rightarrow a^2 = 7 \Rightarrow a = \pm \sqrt{7} \xrightarrow{\text{if}} a = \sqrt{7} \Rightarrow 7b = 1, \underline{b = \frac{1}{7}}$$

$$\xrightarrow{\text{if}} a = -\sqrt{7} \Rightarrow \underline{b = \frac{1}{7}}$$

$$\rightarrow c(7x + 1) + d = 7x - 1$$

$$\Rightarrow 7c = 7 \Rightarrow c = 1, \frac{7}{7} + d = -1 \Rightarrow d = -1 - 1 = -2$$

$$f(-1) = (1) \quad 7x + 1 = -7 + 1 = -6$$

$$(2) \quad -7x + 1 = 7 - 1 = 6$$

$$(1) \quad g(-6) = \frac{1}{7}(-6) - \frac{1}{7} = -\frac{6}{7} - \frac{1}{7} = -\frac{7}{7} = -1$$

$$(2) \quad g(6) = \frac{1}{7}(6) - \frac{1}{7} = \frac{6}{7} - \frac{1}{7} = \frac{5}{7}$$

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

$$g(x) = \frac{1}{x^2 - 5x}$$

(6)

(7)

$$g \circ f \rightarrow \{x \in D_f, f(x) \in D_g\} \rightarrow D_f \rightarrow x + |x| > 0$$

P4PCO

$$\rightarrow x > -\frac{|x|}{2} \Rightarrow x > 0$$

$$g(x) \rightarrow x^2 - 5x \neq 0 \rightarrow x(x - 5) \neq 0 \rightarrow x \neq \{0, 5\}$$

$$\sqrt{n+|n|} \neq 0 \Rightarrow n+|n| \neq 0 \Rightarrow n \neq 0, \sqrt{n+|n|} \neq \varepsilon \Rightarrow n+|n| \neq 14$$

$$\Rightarrow \textcircled{1} n+1 \Rightarrow Df \circ g = (0, +\infty) - \{1\}$$

②

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

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

$$f+g \circ f \rightarrow \{x \in Df, f(x) \in Dg\}$$

⑤

$$\rightarrow 1-x^2 \geq 0 \Rightarrow x^2 \leq 1 \Rightarrow |x| \leq 1 \textcircled{1}$$

$$\textcircled{2} f+g \xrightarrow{\cup \sqrt{1-x^2}} f = |x| \leq 1 \Rightarrow \begin{matrix} \text{ } \\ \text{ } \end{matrix} \Rightarrow \begin{matrix} \text{ } \\ \text{ } \end{matrix}$$

$$\Rightarrow \begin{matrix} \text{ } \\ \text{ } \end{matrix} \sqrt{1-x^2} \leq 1 \rightarrow \sqrt{1-x^2} \leq 1 \Rightarrow 1-x^2 \leq 1$$

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

⑧

$$\text{ex) } f\left(\frac{pn+1}{n-p}\right) = pn + \omega$$

⑨

$$\frac{pn+1}{n-p} = t \Rightarrow t(n-p) = pn+1 \Rightarrow tn - pn = pt+1$$

$$\Rightarrow n(1-p) = pt+1 \Rightarrow n = \frac{pt+1}{1-p} \rightarrow \left(\frac{pn+1}{n-p}\right) = pn + \omega$$

$$\Rightarrow f(x) = \frac{1x+\varepsilon}{n-p} + \omega \Rightarrow f(x) = \frac{1x-11}{n-p}$$

$$f\left(\underbrace{x + \frac{1}{x}}_t\right) = \underbrace{x^p + \frac{1}{x^p}}_{t^p - p}$$

(1)

$$\left(\underbrace{x + \frac{1}{x}}_t\right) \left(\underbrace{x^p - 1 + \frac{1}{x^p}}_{t^p - p}\right)$$

$$t^p = x^p + \frac{1}{x^p} + p$$

$$\Rightarrow f(t) = t(t^p - p) \xrightarrow{t=x} \underline{f(x) = x^p - \frac{p}{x}}$$

$$g(x) \longrightarrow (1 + \sqrt{p}) \rightsquigarrow (x-1)(x - \sqrt{p})$$

(1)

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

$$\rightarrow g \circ f(x) \longrightarrow x^p - (1 + \sqrt{p})x + \sqrt{p}$$

$$\Rightarrow (x\sqrt{x})^p - (1 + \sqrt{p})x\sqrt{x} + \sqrt{p}$$

(5)

$$x-1=0 \Rightarrow x\sqrt{x}-1=0 \Rightarrow x\sqrt{x}=1 \rightsquigarrow \underline{x=1}$$

$$\hookrightarrow x - \sqrt{p} = 0 \Rightarrow x\sqrt{x} - \sqrt{p} = 0 \Rightarrow x\sqrt{x} = \sqrt{p}$$

$$\hookrightarrow x^{\frac{3}{2}} = \sqrt{p} \Rightarrow \underline{x = p}$$

$$\Rightarrow \underline{p-1=1}$$