

$f(f(\frac{\pi}{\sqrt{3}})) = f(\cot \frac{\pi}{4}) = f(\sqrt{3}) = \sqrt{3+1} = 2$ (4) ①

الف) $g(\frac{\pi}{\sqrt{3}}) = 1 \cos^2 \frac{\pi}{\sqrt{3}} = \frac{1}{\sqrt{3}} / x = \frac{1}{\sqrt{3}} \rightarrow f(\frac{1}{\sqrt{3}}) = \sqrt{\frac{1}{\sqrt{3}}} = \frac{\sqrt{3}}{\sqrt{3}} = 1$ (5)

$\rightarrow f(g(\frac{\pi}{\sqrt{3}})) = \frac{\sqrt{3}}{1} = \sqrt{3}$ (2) ✓

ب) $g(\sqrt{2}) = \frac{\sqrt{2}}{1-\sqrt{2}}$ $f(\frac{\sqrt{2}}{1-\sqrt{2}}) = f(-\frac{\sqrt{2}}{\sqrt{2}-1}) = -\sqrt{2}$ (3) ✓

$f(\frac{\pi}{\sqrt{2}}) = \sin \frac{\pi}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $g(\frac{\sqrt{2}}{2}) = \frac{\sqrt{2}}{2} \sqrt{1-\frac{1}{2}} = \frac{1}{2}$ (2) ✓

الف) $f \circ g(x) = \{ (f_9 \omega) (2_9 \omega) (3_9 12) (1_9 12) \}$ $\rightarrow g \circ f(x) = \emptyset$ $f \circ f(x) = \emptyset$ (5) ✓

ب) $g \circ g(x) = \{ (f_9 \omega) (2_9 6) (3_9 6) \}$ (4) ✓

$f \rightarrow \omega \rightarrow 1 \rightarrow \dots \rightarrow b = \omega$
 $f \rightarrow \sqrt{3} \rightarrow 2 \rightarrow \dots \rightarrow a = \sqrt{3}$
 $(a, b) = (f_9 \omega)$ (2) ✓

$f(f(x)) = a(ax+b) + b = a^2x + ab + b = 5x + 13$
 $a=2 \rightarrow b=1 \rightarrow f(1)=-1$
 $a=-2 \rightarrow b=-3 \rightarrow f(-1)=1$ (2) ✓

$2x+3=-1 \rightarrow x=-2 \rightarrow g(-1) = 3(-2) - 2 = -8$ (2) ✓

$g \circ f(x) = \frac{1}{x+|x|-5\sqrt{x+3}}$
 $x+|x| \neq 14 \rightarrow x \neq 14$ (2) ✓

$x+|x| > 0 \rightarrow D_f = (0, +\infty) - \{14\}$ (2) ✓

$f(x) + g(x) \rightarrow D_f = [1, 1]$ و $D_g = [0, +\infty)$ $\rightarrow D_{f+g(x)} = [0, 1]$ (1,5) ①

$R_f = [0, 1]$ $f(x) \in D_{f+g}$
 $D_{f+g} = [0, 1]$ $\cdot \sqrt{1-x^2} \leq 1$

$D_{f+g} = [-1, 1]$

محدوده بردار $x^2 \geq 0$

$$\text{الف) } \frac{r_{n+1}}{n-r} = t \rightarrow r_{n+1} = t(n-r) \rightarrow r_n - t_n = 1 - r_t \rightarrow r(r-t) = -\frac{1}{r-t} \quad (9)$$

$$\rightarrow r = \frac{1+r_t}{t-r} \Rightarrow f\left(\frac{1+r_t}{t-r}\right) + 1 \Rightarrow \frac{f+1t+10t-10}{t-r}$$

$$= \frac{1r_t - 11}{t-r} \rightarrow f(n) = \frac{1r_n - 11}{n-r} \quad \checkmark$$

(X)

$$\text{ب) } n + \frac{1}{n} = t \rightarrow (n + \frac{1}{n})^r = n^r + \frac{1}{n^r} + r_n + \frac{r}{n}$$

$$\rightarrow n^r + \frac{1}{n^r} = r(n + \frac{1}{n}) + (n + \frac{1}{n})^r \rightarrow f(n) = \frac{r(n + \frac{1}{n}) + (n + \frac{1}{n})^r - n^r - \frac{1}{n^r}}{n-r} \quad \checkmark$$

$$g(f(n)) = 0 \rightarrow g(r\sqrt{r}) \neq g(1) = 0 \quad (10)$$

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

$$|r-1| = 1 \quad \checkmark$$

(X)