

$\text{fot}\left(\frac{r}{r}\right) \rightarrow f\left(\frac{r}{r}\right) = \cot \frac{r}{r} = \cot \frac{\pi}{4} = \sqrt{r}$
19, VO

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

$\hookrightarrow f(\sqrt{r}) = \sqrt{(\sqrt{r})^2 + 1} = \sqrt{r+1} = \sqrt{r} = r$

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

$\text{ب)} f(x) = [x] \rightarrow f(-r - \sqrt{r}) = [-r - \sqrt{r}] = \boxed{-r}$
 $g(x) = \frac{x}{1-x} \rightarrow \frac{\sqrt{r}}{1-\sqrt{r}} \times \frac{1+\sqrt{r}}{1+\sqrt{r}} = \frac{r+\sqrt{r}}{-1} = -r - \sqrt{r}$
 $f(g(\sqrt{r})) = ?$

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$f(x) = \sin x = f\left(\frac{\pi}{r}\right) = \sin \frac{\pi}{r} = \frac{\sqrt{r}}{r}$

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

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

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$\text{و)} \text{fog}(x) = \int (r, \omega) (r, \omega) (y, r) (x, r) \}$

$\text{ب)} \text{got}(x) = \infty$

$\text{ج)} \text{tof}(x) = \infty$

$\text{د)} \text{gog}(x) = \{(r, x) (r, y) (y, b) \}$

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$\text{fog}(x) \rightsquigarrow f(g(r)) = r$
 $g(r) = r \rightarrow a = r$
 $g(\omega) = 1 \rightarrow b = \omega$
 $\rightarrow (r, \omega)$
 $g(f(r)) = 1$

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$f(f(x)) = rx + r \rightarrow \text{fot}(x) = a(ax+b) + b = arx + ab + b = rx + r$

$ar = r$

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$g(rx + r) = rx - r$

$a = \begin{cases} r & - b = 1 \Rightarrow f(-1) = -1 \\ -r & \rightarrow b = -r \Rightarrow f(-1) = -1 \end{cases}$

$g\text{of}(-1) = g(-1) \rightarrow -1 = rx + r$
 $-r = rx \rightarrow x = -r$
 $g(-1) = r(-r) - r = \frac{-r}{r}$

$f(x) = \sqrt{x+|x|} \begin{cases} \oplus \rightarrow r \\ \circ \rightarrow 0 \\ \ominus \rightarrow 0 \end{cases} \rightarrow D_f = \mathbb{R}$

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

$x \in \mathbb{R}^+ \quad x \neq r$

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$g\text{of}(x) \Rightarrow D_{g\text{of}} = \{x \in D_f : f(x) \in D_g\} \rightarrow \{x \in \mathbb{R} : \sqrt{x+|x|} \neq 0, r\} \Rightarrow D_{g\text{of}} = (0, +\infty) - \{r\}$

$$f(\lambda) = \sqrt{1-\lambda^2} \rightarrow D_f = [-1, 1] \quad R_f = \rightarrow \left| -\frac{b}{ra} = 0 \right| \quad \sqrt{(-\infty, 1]} = [0, 1]$$

$$g(\lambda) = \sqrt{\lambda} \rightarrow D_g = [0, +\infty)$$

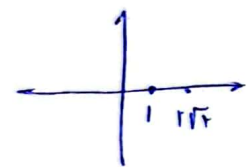
$$D_{(f+g) \circ f} = \rightarrow \left\{ \lambda \in D_g \cap D_f \mid \underbrace{f(\lambda)}_{\substack{[0, 1] \\ [-1, 1]}} \in D_g \cap D_f \right\} \Rightarrow D_{(f+g) \circ f} = \begin{bmatrix} 0, 1 \\ -1, 1 \end{bmatrix}$$

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$$ii) f\left(\frac{r\lambda+1}{\lambda-1}\right) = r\lambda+1 \rightarrow \frac{r\lambda+1}{\lambda-1} = t \rightarrow \frac{r(t+1)}{t-1} = \lambda \rightarrow f\left(\frac{r(t+1)}{t-1}\right) = \frac{\lambda t + r + \omega t - \omega}{t-1} \Rightarrow \frac{13t-11}{t-1} = f(t) \quad (\text{سوال})$$

$$b) f\left(\lambda + \frac{1}{\lambda}\right) = \lambda^r + \frac{1}{\lambda^r} \rightarrow \left(\lambda + \frac{1}{\lambda}\right)^r = t^r \rightarrow \lambda^r + \frac{1}{\lambda^r} + r\left(\lambda + \frac{1}{\lambda}\right) = t^r \rightarrow \lambda^r + \frac{1}{\lambda^r} = t^r - r\lambda \Rightarrow f(\lambda) = \frac{13\lambda-11}{\lambda-1}$$



$$g(2\sqrt{\lambda}) = 0 \rightarrow \lambda\sqrt{\lambda} = 2\sqrt{1} \rightarrow \lambda = 2$$

$$\lambda\sqrt{\lambda} = 1 \rightarrow \lambda = 1$$

$$\rightarrow \boxed{r-1=1}$$

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