

هنا عقا،

$$f\left(f\left(\frac{r}{r}\right)\right) \Rightarrow f\left(\frac{r}{r}\right) = \cos \frac{\pi \times \frac{r}{r}}{\frac{r}{r}} = \pi \times \frac{1}{r} = \frac{\pi}{r} = 4\sqrt{31} \quad (1)$$

$$f(\sqrt{31}) = \sqrt{(\sqrt{31})^2 + 1} = \sqrt{32} = \boxed{2}$$

$$f\left(g\left(\frac{\sqrt{31}}{\pi}\right)\right) \Rightarrow g\left(\frac{\sqrt{31}}{\pi}\right) = r \cos \frac{\pi}{r} = r \left(\frac{1}{r}\right)^2 = \frac{1}{r} \quad (2) \text{ انف}$$

$$f\left(\frac{1}{r}\right) \quad \frac{1}{n} = \frac{1}{r} \rightarrow n = r \rightarrow f\left(\frac{1}{r}\right) = \sqrt{\frac{r}{r}} = \frac{\sqrt{31}}{r}$$

$$f(g(\sqrt{31})) \rightarrow g(\sqrt{31}) = \frac{\sqrt{31}}{1 - \sqrt{31}} \approx \frac{1,4}{-0,4}$$

$$-4 < -\frac{1,4}{0,4} < -3 \Rightarrow f\left(-\frac{1,4}{0,4}\right) = \left[-\frac{1,4}{0,4}\right] = \boxed{-4}$$

$$g\left(f\left(\frac{\pi}{r}\right)\right) \Rightarrow f\left(\frac{\pi}{r}\right) = \sin \frac{\pi}{r} = \frac{\sqrt{31}}{r}$$

$$g\left(\frac{\sqrt{31}}{r}\right) = \frac{\sqrt{31}}{r} \times \sqrt{1 - \left(\frac{\sqrt{31}}{r}\right)^2} = \frac{\sqrt{31}}{r} \times \frac{1}{\sqrt{31}} = \boxed{\frac{1}{r}} \quad (3)$$

$$\text{انف) } f(g(n)) = \{(4, \frac{1}{4})(15, \omega)(2, \omega)(1, 12)\} \quad (4)$$

$$\text{ب) } g(f(n)) = \emptyset$$

$$\text{ج) } \emptyset \circ f = \emptyset$$

$$\text{د) } g(g(n)) = \{(15, 1)(2, 4)(4, 10)\}$$

$$f(g(a)) = (f, r) \rightarrow f(r) = r$$

②

$$g(\cancel{a}) = r \rightarrow n = f \rightarrow \boxed{a = f}$$

$$f \leftarrow g(f(a)) = (f, 1) \rightarrow$$

$$g(f) = a$$

$$g(b) = 1$$

$$f(b) = 1 \Rightarrow \boxed{b = a}$$

$$\boxed{(f, a)}$$

$$\begin{cases} n \in \mathbb{D}_f \\ f \in \mathbb{D} \end{cases} \Rightarrow \begin{cases} \mathbb{D}_f = 1 - n^2 \geq 0 & n^2 \leq 1 \\ -1 \leq n \leq 1 \end{cases} \quad (1)$$

$$(f+g) \Rightarrow \mathbb{D}_{(f+g)} = 0, < n \leq 1 \quad \star \star$$

$\star \cap \star \star \rightarrow [0, 1]$

$$f\left(\frac{r n + 1}{n - r}\right) = r n + \omega \rightarrow \frac{r n + 1}{n - r} = t$$

$$r n + 1 = t n - r t \quad (r - t) n = -(r t + 1) \Rightarrow n = \frac{-(r t + 1)}{r - t} \quad (9)$$

$$f(t) = \left(r \times \frac{-(r t + 1)}{r - t} \right) + \omega \Rightarrow f(n) = - \frac{r(r n + 1)}{r - n} + \omega$$

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

$$t^r = n^r + \frac{1}{n^r} + r \left(n^r + \frac{1}{n^r}\right) (1)$$

$$f(t) = t^r - r t \rightarrow f(n) = n^r - r n$$

(10) تابع g بازای 1 و $\sqrt{r}$ صفر می شود، پس باید $f(n)$ و $f(n)$ برابر

این دو مقدار قرار دهیم تا $f \circ g$ صفر شود.

$$\left. \begin{aligned} f(n) = r\sqrt{r} &\rightarrow n\sqrt{n} = r\sqrt{r} \rightarrow n = r \\ f(n) = 1 &\rightarrow n\sqrt{n} = 1 \rightarrow n = 1 \end{aligned} \right\} r - 1 = 1$$

$$f(n) = -1$$

$$an + b$$

(9)

$$a(an + b) + b = cn + r$$

$$a^2n + ab + b = cn + r$$

$$a^2 = c \rightarrow a \pm 1$$

$$ab + b = r$$

$$b = -3 \leftarrow a = -2 \quad \checkmark$$

$$b = 1 \leftarrow a = 2 \quad \checkmark$$

$$y = -2n - 3 \quad \vee \quad y = 2n + 1$$

نکته: از این (-1) عدد و مقدار (-1) حاصل می شود.

$$\Rightarrow f(-1) = -1 \rightarrow g(-1) = 2n + r = -1$$

$$2n = -1 - r \rightarrow \boxed{n = -1}$$

$$g(-1) = r(-1) - 1 = -2 - 1 = -1$$

$$\boxed{g(f(-1)) = -1}$$

(V)

$$\begin{cases} n \in D_f \rightarrow \mathbb{R} \\ f(n) \in D_g \end{cases} \Rightarrow$$

$$n + |n| \geq 0$$

$$|n| \geq -n \quad \checkmark \text{ همیشه}$$

$$D_g = \{x^2 - \varepsilon x \neq 0\}$$

$$\left. \begin{aligned} x^2 \neq \varepsilon x &\rightarrow x \neq \varepsilon \\ &\leftarrow x \neq 0 \end{aligned} \right\}$$

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

$$x + |x| \neq 0 \Rightarrow x \neq -1$$

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

$$\Rightarrow (0, +\infty) - \{-1\}$$

$$D_{g \circ f} \Rightarrow \emptyset$$