

$$f(n) = an + b \rightarrow f \circ f(n) = a(an + b) + b = a^2n + ab + b = \sum n + r \rightarrow ar = r$$

$$g(t) \rightarrow rn + r = t \rightarrow n = \frac{t-r}{r} \rightarrow r \left(\frac{t-r}{r} \right) - r = \frac{rt - r^2}{r} - r = \frac{rt - r^2 - r^2}{r} = \frac{rt - 2r^2}{r}$$

$$g(n) = \frac{rn - 2r^2}{r} / g(f(n)) \rightarrow f(n) = -rn - r \xrightarrow{n \rightarrow -1} y = -1$$

$$\rightarrow f(n) = rn + 1 \xrightarrow{n \rightarrow -1} y = -1 \rightarrow g(-1) = ?$$

$$g(-1) = \frac{-r - 2r^2}{r} = \underline{\underline{-1}}$$

$$f(n) = \sqrt{n+1} / g(n) = \frac{1}{n^2 - \varepsilon n} \rightarrow n^2 - \varepsilon n \neq 0 \rightarrow n(n - \varepsilon) \neq 0 \rightarrow D_g = \mathbb{R} - \{0, \varepsilon\}$$

$$\rightarrow n + 1 \geq 0 \rightarrow \mathbb{R} \checkmark \} D_{g \circ f} = \{n \in D_f, f(n) \in D_g\} + \{n \in \mathbb{R}, \sqrt{n+1} \neq 0, \sqrt{n+1} \neq 1\}$$

$$\rightarrow D_{g \circ f} = \{n \in \mathbb{R}, n \neq -1, n \neq 0\} \rightarrow D_{g \circ f} = [0, +\infty) - \{1\}$$

$$D_{f \circ g} = \{x \in D_f, f(x) \in D_{f \circ g}\} / f(x) = \sqrt{1-x^2} \rightarrow D_f = [-1, 1] \} g(x) = \sqrt{x} \rightarrow D_g = [0, +\infty)$$

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

$$f(x) \in D_{f \circ g} \rightarrow 0 \leq \sqrt{1-x^2} \leq 1 \rightarrow 0 \leq 1-x^2 \leq 1 \rightarrow -1 \leq -x^2 \leq 0 \rightarrow 1 \geq x^2 \geq 0$$

$$\rightarrow x^2 \geq 0 \rightarrow x \in [-1, 1] \} D_{(f \circ g) \circ f} = \{x \in [-1, 1], f(x) \in [-1, 1]\} \Rightarrow D_{(f \circ g) \circ f} = [-1, 1]$$

$$\text{اذا) } f\left(\frac{rn+1}{n-r}\right) = \varepsilon n + \omega \rightarrow \frac{rn+1}{n-r} = t \rightarrow n = \frac{rt+1}{t-r} \rightarrow f(t) = \frac{rt+1}{t-r} + \omega$$

$$f(t) = \frac{rt+1}{t-r} \rightarrow f(n) = \frac{rn+1}{n-r}$$

$$\text{ب) } f\left(n + \frac{1}{n}\right) = n^r + \frac{1}{n^r} \rightarrow n + \frac{1}{n} = t \rightarrow n^r + \frac{1}{n^r} + r\left(n + \frac{1}{n}\right) = t^r \rightarrow n^r + \frac{1}{n^r} = t^r - r \cdot \frac{1}{n}$$

$$\{f(n) = n^r - rn\}$$

$$g(\sqrt{r}) = 0 \} \rightarrow g(f(n)) = 0$$

$$g(1) = 0 \} \rightarrow f(n) = \sqrt{r} = n\sqrt{x} \rightarrow n = r$$

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