

$$D(y) \in \mathbb{R} \text{ و } f \rightarrow \sqrt{-n^2 - 2n - 2} = \sqrt{(n+1)^2} \rightarrow D_f = \{2\}$$

$$R_f = \{2\} \rightarrow \sqrt{1 - 2n - 1} = 2 \rightarrow |2n| = 1 \rightarrow n = -1, 1 \rightarrow \text{نقطه } (1, 2) \quad \checkmark$$

(۲)

$$f \circ g = 2(n^2 - 2n + 1) - 2 = 2n^2 - 4n + 1$$

$$g \circ f = (2n - 2)^2 - 2(2n - 2) + 1 = 4n^2 - 8n + 4 - 4n + 4 + 1 = 4n^2 - 12n + 9$$

$$\rightarrow 4n^2 - 12n + 9 = 0 \rightarrow \Delta = 12^2 - 4 \cdot 4 \cdot 9 = 0 \rightarrow n = \frac{12}{8} = \frac{3}{2} \quad \checkmark$$

(۲)

$$2n = t \rightarrow n = \frac{t}{2} \rightarrow \Delta\left(\frac{t}{2}\right)^2 + 1 = g(x) \rightarrow \frac{\Delta t^2}{2} + 1 = g(x)$$

$$g(x) = \frac{\Delta x^2}{2} + 1 \rightarrow g(n-1) = \frac{\Delta(n-1)^2}{2} + 1 \rightarrow \min_{n=1}^{\infty}$$

(۱, ۵)

$$R_{g \min} = 11$$

$$f(g(n)) = 2n^2 - 4n - 1 \rightarrow f(g(n)) = 2n^2 - 4n - 1$$

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

$$g \circ f = (2n - 2)^2 - 2(2n - 2) + 1 = 4n^2 - 8n + 4 - 4n + 4 + 1 = 4n^2 - 12n + 9 \quad \checkmark$$

(۲)

$$f(n) = 2n + 2 \quad g(n) = 2n - 1$$

$$f \circ g(n) = 4n + 2$$

$$4n + 2 = \frac{1}{a}n - 2$$

$$f \circ g(n) = y = \frac{1}{a}n - 2$$

$$a = -\frac{1}{4}$$

(۲)

$$q \log^q \leq \log^q q$$

$$f \circ g(n) = n^r$$

$$n^r \leq n^r \rightarrow \{0, 1\} \quad g \circ f(n) = rn$$

$$f \circ g(n) - g \circ f(n) < 0 \rightarrow n^r - rn < 0 \rightarrow \cdot \sqrt[n]{n} < r$$

$$f\left(\frac{n^r - r}{n}\right) = f\left(n - \frac{r}{n}\right) = \left(n^r + \frac{r}{n^r} - r\right) + \left(n - \frac{r}{n}\right)$$

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

$$D_{f \circ g} = \{n \in D_g, g(n) \in D_f\}$$

$$D_g = \mathbb{R} \quad D_f = x > 0 \rightarrow \lambda n - n^r > 0 \rightarrow A = (0, 1)$$

$$B = R_{f \circ g} = (-\infty, r] \quad A \cap B = (0, r] \rightarrow \text{answer is } \mathbb{R}$$

$$f(f(n)) = 1 - r f(n) \rightarrow f(n) = 1 - r n^r$$

$$h(g(n)) = (n-1)^r + r(n-1) + 1 = n^r - r n^{r-1} + \Delta n - r$$

$$n^r - r n^{r-1} + r n^{r-1} + 1 = 1 - r n^{r-1}$$

$$\boxed{n^r + r n - r = 0} \quad h(g(n)) = f(n) \rightarrow n^r = -\Delta n + r$$

$$g \circ f(n) = g\left(n - \frac{r}{n}\right) = a n^r + r n$$

$$g(r) = 1 \rightarrow n - \frac{r}{n} = r \rightarrow n = r \leq n = -1$$

$$\begin{cases} n = r \rightarrow r a + 1 = 1 \rightarrow a = 0 \\ n = -1 \rightarrow -a - r = 1 \rightarrow a = -b \end{cases}$$