

$$f(n) = 9^n = 3^{2n}$$

$$g(n) = \log_3 n \Rightarrow \log_3 \log_3 n \Rightarrow 3^{\log_3 n} \leq \log_3 3^{2n} \Rightarrow n \leq 2n$$

$$\Rightarrow n \leq 2n \Leftrightarrow n(n-1) \leq 0 \Rightarrow 0 < n \leq 2 \Rightarrow n \neq 0$$

$$\Rightarrow D_n = (0, 2] \Rightarrow \{1, 2\}$$

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

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

$$f(n) = \log_3 n \quad g(n) = 1n - n^r$$

$$\log \Rightarrow \log_3 (1n - n^r) \quad 1n - n^r \Rightarrow n(1-n) > 0 \Rightarrow 0 < n < 1$$

$$\Rightarrow D_f = (0, 1) = A$$

$$R_f \Rightarrow \min x \Rightarrow \max = -\frac{b}{2a} \Rightarrow n = \frac{1}{2} \Rightarrow \log_3 \frac{1}{2} = \frac{1}{2} \Rightarrow R_f = \left(\frac{1}{2}, \frac{1}{2}\right] = B$$

$$A \cap B \Rightarrow (0, \frac{1}{2}] \Rightarrow \{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots\}$$

$$f \circ g(n) = 1 - f(n) \Rightarrow f(n) = 1 - f(n) \Rightarrow h(g(n)) = f(n)$$

$$g(n) = n - 1, \quad h(n) = n^r + r n + 1$$

$$\Rightarrow (n-1)^r + r(n-1) + 1 = 1 - f(n) \Rightarrow n^r - r n^{r-1} + r n - r + 1 = 1 - f(n)$$

$$n^r + r n - r = 0 \Rightarrow \dots$$


$$f(n) = n - \frac{r}{n}$$

$$g(f(n)) = 1 \Rightarrow f(n) = r \Rightarrow n - \frac{r}{n} = r \Rightarrow n = \begin{cases} r \\ -1 \end{cases}$$

$$g(f(n)) = a n^r + r n$$

$$g(1) = 1$$

$$\Rightarrow \begin{cases} a = r \Rightarrow 4r + 1 = 1 \Rightarrow a = 0 \\ a = -1 \Rightarrow -a - r = 1 \Rightarrow a = -1 \end{cases}$$