



$$f(n+\sqrt{n}) \leq n^2 + 2\sqrt{n}, f(4) \leq ?$$

$$n+\sqrt{n} \leq 4 \xrightarrow{\sqrt{n} \leq 4-n} t^2+t-4 \leq 0 \quad \begin{cases} \sqrt{n} \leq -1/2 \\ \sqrt{n} \leq 4 \end{cases} \rightarrow n \leq 16 \Rightarrow f(4) \leq \frac{(4)^2}{209} + \frac{4^2}{12} = 1.94 \checkmark$$

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(2) (1)

$$f(n) \leq n^2 + n, f(n-1) + f(1-n) \leq ?$$

$$f(n-1) \leq (n-1)((n-1)^2+1) \Rightarrow (n-1)((n-1)^2+1) - (n-1)((n-1)^2+1) \leq 0$$

$$f(1-n) \leq (1-n)((1-n)^2+1) \xrightarrow{(1-n)^2 \leq (n-1)^2} - (n-1)((n-1)^2+1)$$

(1) (1)

$$f(n) \leq \sqrt{f(n-a)+k-1}, g(n) \leq \sqrt{b-f(n)+k}$$

$$f \circ g \leq \{(1, k)\} \Rightarrow D_{f \circ g} \leq \{1\}$$

$$f(n-a) \geq 0 \quad b-f(n) \geq 0$$

$$f(n) \leq \frac{b}{f} \Rightarrow \frac{na}{f} \leq \frac{b}{f} \leq 1 \Rightarrow \frac{b}{f} \leq 1 \Rightarrow f(n) \leq \sqrt{f(n)-f} + k-1$$

$$g(n) \leq \sqrt{f-f(n)+k}$$

$$na - \frac{b}{f} - k \leq f - f + 1 \leq 1 \checkmark$$

(2) (1)

$$f(n) \leq \sqrt{m-n} + h, g(n) \leq \sqrt{r+n+r}, D_{f \circ g} = D_f \cap D_g \leq [-1, v]$$

$$f \circ g \leq 4 \sqrt{r} \quad \begin{cases} f(r) \leq \sqrt{v-r} + h \leq r+h \\ g(r) \leq \sqrt{r(r)+r} \leq r \sqrt{r} \end{cases}$$

$$r+h+r \sqrt{r} \leq 4 \sqrt{r} \Rightarrow n \leq 4\sqrt{r}-r \rightarrow m+n \leq 4\sqrt{r}$$

(10) (1)