

حساباتی - آزمون ۱۲

$$\text{مثال} \rightarrow g(f(x)) = \{x \in Df / f(x) \in Dg\} \quad Df = \textcircled{1} x-1 > 0 \quad x < 1$$

$$\textcircled{2} \log_r^{x-1} \geq 0 \quad x-1 \geq r^0 \quad x \geq r^0 + 1 \xrightarrow{r=2} x \geq 2 \quad \textcircled{1}$$

$$Dg: -x^r + 9x - 9 \geq 0 \xrightarrow{\Delta=0} \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-9 \pm \sqrt{81 - 36}}{2} = \frac{-9 \pm 3}{2} \xrightarrow{\text{وحد}} \frac{r}{-1} = -r \quad Dg = \{r\}$$

$$Df \circ g = \{x \in [r_0 + \infty) / \sqrt{\log_r^{x-1}} \in r\} \rightarrow \textcircled{1} \textcircled{2} \rightarrow \log_r^{x-1} = \varepsilon \quad x-1 = r^\varepsilon \quad x = r^\varepsilon + 1$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow Df \circ g = [r_0 + \infty)$$

$$f \circ g(x) = g \circ f(x) \rightarrow f(g(x)) = g(f(x)) \quad \textcircled{2}$$

$$\textcircled{1} f \circ g(x) \rightarrow r(x^r - 9x + 1) - 9 \rightarrow rx^r - 9x + 11$$

$$\textcircled{2} g \circ f(x) \rightarrow (rx - 9)r - r(rx - 9) + 1 \rightarrow \varepsilon x^r + r\varepsilon - r^2x + r^2$$

$$\Phi \rightarrow rx^r - 9x + 11 = \varepsilon x^r - r^2x + r^2 \rightarrow rx^r - r^2x - 9 = 0 \quad x^r + \beta^r \rightarrow \frac{(x+\beta)^r}{-\frac{b}{a}} - \frac{r\alpha\beta}{\frac{c}{a}}$$

$$\rightarrow (10)^r - r \times \frac{9}{r} \rightarrow 100 + 9 \rightarrow \boxed{109}$$

$$g(f(x)) = \omega x^r + 11 \quad f(x) = rx \xrightarrow{rx=t} g(rx) = \omega x^r + 11 \xrightarrow{rx=t} g(t) = \omega \left(\frac{t}{r}\right)^r + 11 \quad \textcircled{3}$$

$$\rightarrow g(x) = \frac{\omega}{\varepsilon} x^r + 11 \xrightarrow{g(x-v)} \frac{\omega}{\varepsilon} (x-v)^r + 11 \rightarrow \omega(x^r + \varepsilon 9 - r^2x) + \varepsilon \varepsilon$$

$$\rightarrow \omega x^r + r\varepsilon 9 - r^2x + \varepsilon \varepsilon \rightarrow \omega x^r - r^2x + r^2 19 \quad \frac{-\Delta}{\varepsilon a} = \frac{b^2 - 4ac}{-4a}$$

$$\frac{\varepsilon 900 - \omega r^2 19}{-r^2} = \frac{-1116}{-r^2} = \boxed{\varepsilon \varepsilon}$$

$$f(g(x)) = rx^r - 9x - 1 \xrightarrow{f(x)=rx-\varepsilon} r^2g(x) - \varepsilon = rx^r - 9x - 1 \quad g(x) = \frac{rx^r - 9x + r^2}{r} \quad \textcircled{4}$$

$$g(x) = \frac{rx^r - 9x + 11}{r} \quad g(x) = x^r - 9x + 1 \rightarrow g(x) = (x-1)^r$$

$$g \circ f(x) \rightarrow g(f(x)) \rightarrow g \circ f(x) = (rx - \varepsilon - 1)^r \rightarrow (rx - \omega)^r \rightarrow \boxed{g \circ f(x) = 9x^r - r^2x + \varepsilon}$$

$$f(f(a)) = 1 - r f'(a) \quad t = f(a) \rightarrow f(t) = 1 - r t^r \rightarrow f(a) = 1 - r a^r \quad (9)$$

$$h(g(a)) = f(a) \quad (a-1)^r + r(a-1) + 1 = a^r \quad a^r - r a^r + r a - 1 + r a - r + 1 = a^r$$

$$a^r - r a^r + 2a - r = 0 \xrightarrow{a=r} 1 - 1 + 2 - r = 0 \implies a^r - r a^r + 2a - r = 0 \implies \frac{a^r - r a^r + 2a - r}{-a^r + r a^r} \quad \frac{a^r - r a^r + 1}{a^r - r a^r + 1}$$

$$\rightarrow (a-r)(a^r - r a + 1) \rightarrow (a-r)(a-1) \xrightarrow{r=1} \begin{array}{l} \text{yes} \\ \text{no} \\ \text{no} \end{array} \quad \begin{array}{r} -r a^r + 2a - r \\ + r a^r - r a \\ \hline a - r \\ - a + r \\ \hline 0 \end{array}$$