

حیاتیاتی - ۱۲ اختر ۱۲

$$\text{مثلاً } g(f(x)) = \{x \in Df / f(x) \in Dg\} \quad Df = \textcircled{1} x-1 > 0 \quad x > 1 \quad \textcircled{2} \log_r^{x-1} \geq 0 \quad x-1 \geq r^0 \quad x \geq r^0 + 1 \rightarrow \textcircled{1} x \geq 2$$

$$Dg: -x^r + 9x - 9 \geq 0 \xrightarrow{\Delta=0} \frac{b}{2a} = -\frac{9}{2r} = -\frac{9}{-2} = \frac{9}{2} \xrightarrow{\text{check}} \frac{9}{2} \quad Dg = \{r\}$$

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

$$\textcircled{1} \cap \textcircled{2} \rightarrow Df \circ g = [r_0 + \infty) \quad Dg \circ f = \{1, r\}$$

۱، ۲، ۵

$$f \circ g(x) = g \circ f(x) \rightarrow f(g(x)) = g(f(x))$$

۱

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

$$\textcircled{2} g \circ f(x) \rightarrow (rx - 9)r - r(rx - 9) + 1 \rightarrow \varepsilon x^r + 29 - 29x + r^2$$

$$100 - 39 = 61$$

$$\Phi \rightarrow rx^r - 9x + 11 = \varepsilon x^r - 29x + r^2 \rightarrow rx^r - 20x - 9 = 0 \quad x^r + \beta^r \rightarrow \frac{(x+\beta)^r}{-\frac{b}{a}} = \frac{r\alpha\beta}{\frac{c}{a}}$$

$$\rightarrow (10)^r - 2x - \frac{9}{r} \rightarrow 100 + 9 \rightarrow \boxed{109} \quad f \circ g(x) = rx^r - 20x + 11$$

$$g(f(x)) = \omega x^r + 11 \quad f(x) = rx$$

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

$$\rightarrow g(x) = \frac{\omega}{\varepsilon} x^r + 11 \xrightarrow{g(x-v)} \frac{\omega}{\varepsilon} (x-v)^r + 11 \rightarrow \omega(x^r + \varepsilon 9 - 19x) + \varepsilon \varepsilon$$

$$\rightarrow \omega x^r + r\varepsilon 9 - 19\omega x + \varepsilon \varepsilon \rightarrow \omega x^r - 19\omega x + 219 \quad \frac{-\Delta}{\varepsilon a} = \frac{b^2 - 4ac}{-4a} \quad g(x-v)$$

$$\frac{\varepsilon 900 - \omega 110}{-20} = \frac{-1100}{-20} = \boxed{55}$$

انتقال طوی ← تأثیری در بر ندارد $R_{min} = 11$

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

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

$$g \circ f(x) \rightarrow g(f(x)) \rightarrow g \circ f(x) = (rx - \varepsilon - 1)^r \rightarrow (rx - \omega)^r \rightarrow g \circ f(x) = 9x^r - 20x + 11$$

$f(g(x)) \leq g(f(x))$ $f \circ g(x) = 9^{\log_9 x} \rightarrow x^{\log_9 9} \rightarrow x^1$ ⑨
 $g \circ f(x) = \log_9 9^x \rightarrow x \times \log_9 9^1 \rightarrow x$
 $x^1 \leq x \rightarrow x^1 - x \leq 0$ $\begin{array}{c} 0 \\ + \quad | \quad - \end{array}$ $\boxed{-10} = [0, 9]$ $\rightarrow$ مطلوب

$f\left(\frac{x^1 - x}{x}\right) = x - \frac{x}{x} + x^1 + \frac{x}{x^1} - x$ ①
 $\hookrightarrow f\left(x - \frac{x}{x}\right) = x - \frac{x}{x} + \left(x - \frac{x}{x}\right)^1 \xrightarrow{x - \frac{x}{x} = t} f(t) = t + t^1$
 $\rightarrow \boxed{f(x) = x^1 + x}$ ✓ ②

$f(x) = \log_9 x$ $A = D_{f \circ g} \rightarrow \{x \in D_g / g(x) \in D_{f(x)}\}$ ①
 $g(x) = 14 - x^2$ $D_{g(x)} = \mathbb{R}$ $D_{f(x)} = x > 0 \rightarrow \{x \in \mathbb{R} / -x^2 + 14x > 0\}$ ①
 $\rightarrow -x^2 + 14x > 0$ $\begin{array}{c} 0 \\ + \quad | \quad - \end{array}$ $D_{f \circ g} = \boxed{[0, 14]}$
 $B = \{x / f \circ g \rightarrow g(x) = -x^2 + 14x \quad \frac{b}{4a} = \frac{14}{-2} = -7$ $\frac{0}{14} \quad \frac{14}{0}$ $\begin{array}{c} 14 \\ | \\ \text{graph} \end{array}$ $R_f = (0, 14]$
 $\frac{x \leq 14}{f(x) \in \mathbb{R}} \rightarrow \log_9 14 \rightarrow \epsilon \rightarrow R_{f \circ g} = x \leq \epsilon$ $A \cap B = \begin{array}{c} \text{interval} \\ 0 \quad \epsilon \quad 14 \end{array} \rightarrow \boxed{[0, \epsilon]}$ مطلوب

$f - g: \begin{vmatrix} 0 & 0 \\ 1 & 1 \end{vmatrix} \rightarrow \frac{y_1 - y_2}{x_1 - x_2} = \frac{0 - 0}{1 - 1} = -1 = a$ $y = -a + b \xrightarrow{b=0} y = -a + 0$ ②
 $\rightarrow f(x) - g(x) = -x + 1$ $\frac{0}{1} \quad \frac{1}{0}$ $\begin{array}{c} 1 \\ | \\ \text{graph} \end{array}$ $f(x) - g(x) = -x + 1$
 $\begin{array}{l} f(x) - g(x) = -x + 1 \\ g(x) - f(x) = -1 \end{array}$ $\begin{array}{l} f(x) - g(x) = -x + 1 \\ g(x) - f(x) = -1 \end{array}$
 $f \circ g = \begin{vmatrix} 0 & 0 \\ 1 & 1 \end{vmatrix} \rightarrow \frac{a - 0}{0 - 1} = -\frac{1}{a}$ $y = -\frac{1}{a}x + b \xrightarrow{b=1} y = -\frac{1}{a}x + 1$ $\begin{array}{l} g(x) = -x + 1 \\ f(x) = x + \epsilon \end{array}$
 $f \circ g = f(g(x)) = 2(-x + 1) + \epsilon \rightarrow f \circ g(x) = -2x + 2 + \epsilon$ $-\frac{1}{a} = 2$ $\boxed{a = -\frac{1}{2}}$ ③

$g(f(x)) = ax^2 + 1$ $g\left(x - \frac{\epsilon}{x}\right) = ax^2 + 1$ $g(1) = 1$ $x - \frac{\epsilon}{x} = 1$ $x^2 - x - \epsilon = 0$ ④
 $-1 \rightarrow g(1) = -a - 1$ $-a - 1 = 1$ $\boxed{a = -2}$ ✓ ⑤
 $\epsilon \rightarrow g(1) = 4\epsilon a + 1$ $4\epsilon a + 1 = 1$ $\boxed{a = 0}$

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

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

$$a^r - r a^r + r a - r = 0 \xrightarrow{a=1} 1 - r + r - r = 0 \Rightarrow a^r - r a^r + r a - r = (a-1)^r$$

$$\rightarrow (a-r)(a^r - r a + 1) \rightarrow (a-r)(a-1)^r \xrightarrow{\text{binom}} \begin{array}{r} a^r - r a^r + r a - r \\ - a^r + r a^r \\ \hline - r a^r + r a - r \\ + r a^r - r a \\ \hline a - r \\ - a + r \\ \hline 0 \end{array}$$

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

$$a^r = -r a + r$$

