

$$gof(x) = \sqrt{-\left(\log_{\frac{1}{2}} x\right)^2} + \sqrt{\left(\log_{\frac{1}{2}} x\right)^2} - \varepsilon \quad \sqrt{\log_{\frac{1}{2}} x - 1} = t \rightarrow -t^2 + \varepsilon t - \varepsilon \geq 0 \rightarrow (1)$$

$$-(t^2 - \varepsilon t + \varepsilon) \geq 0 \rightarrow -(t - \frac{\varepsilon}{2})^2 \geq 0 \rightarrow t - \frac{\varepsilon}{2} = 0 \rightarrow t = \frac{\varepsilon}{2} \rightarrow \log_{\frac{1}{2}} x - 1 = \frac{\varepsilon}{2} \rightarrow x - 1 = 14 \rightarrow (1) \quad x = 15$$

$$(2) \quad x - 1 > 0 \rightarrow x > 1$$

$$(3) \quad \log_{\frac{1}{2}} x - 1 \geq 0 \rightarrow x - 1 \geq 0 \rightarrow x \geq 1 \xrightarrow{x=1} x > 1 \rightarrow D_{gof} = \{15\}$$

(2)

$$f_{\log}(x) = 2(x^2 - 3x + 1) - \omega = 2x^2 - 4x + 11 \rightarrow f_{\log}(x) = g_{\log}(x) \rightarrow (2)$$

$$g_{\log}(x) = \underbrace{(2x - \omega)^2}_{2x^2 - 2\omega x + \omega^2} - \underbrace{3(2x - \omega)}_{6x - 3\omega} + 11 = 2x^2 - 2\omega x + \omega^2 - 6x + 3\omega + 11$$

$$2x^2 - 4x + 11 = 2x^2 - 2\omega x + \omega^2 - 6x + 3\omega + 11 \rightarrow 2x^2 - 4x + 11 = 2x^2 - 2\omega x + \omega^2 - 6x + 3\omega + 11$$

$$x = \frac{20 \pm \sqrt{400 - 244}}{2} = \frac{20 \pm \sqrt{156}}{2} = 10 \pm \frac{\sqrt{156}}{2}$$

$$\alpha = 10 + \frac{\sqrt{156}}{2} \quad \beta = 10 - \frac{\sqrt{156}}{2}$$

$$\alpha + \beta = 20 = 4 \times 5 \quad (2)$$

$$g_{\log}(x) = a(x)^2 + 11 = \omega x^2 + 11 \rightarrow a(x^2) = \omega x^2 \rightarrow \omega a = \omega \rightarrow a = \frac{\omega}{x} \quad (3)$$

$$g(x) = \frac{\omega}{x} x^2 + 11 \xrightarrow{x=5} g(x-5) = g(0) = 11 = \min g(x-5)$$

(2)

$$f_{\log}(x) = 3(g(x)) - \varepsilon = 3x^2 - 4x - 1 \rightarrow 3(g(x)) = 3x^2 - 4x + 3 \rightarrow (4)$$

$$g(x) = x^2 - 2x + 1 \rightarrow gof(x) = \underbrace{(3x - \varepsilon)^2}_{9x^2 - 2\varepsilon x + \varepsilon^2} - \underbrace{3(3x - \varepsilon)}_{-9x + 3\varepsilon} + 1 = 9x^2 - 2\varepsilon x + \varepsilon^2 - 9x + 3\varepsilon + 1$$

(2)

$$2g(x) = 3f(x) - 1\varepsilon \rightarrow g(x) = \frac{3}{2}f(x) - \frac{1}{2}\varepsilon \rightarrow \text{هر ربع خطي} \quad (5)$$

$$f - g(x) = -x + \omega \rightarrow f(x) - \frac{3}{2}f(x) + \frac{1}{2}\varepsilon = -\frac{1}{2}f(x) + \frac{1}{2}\varepsilon = f - g(x) \rightarrow$$

$$-\frac{1}{2}f(x) + \frac{1}{2}\varepsilon = -x + \omega \rightarrow f(x) = 2x + \varepsilon$$

$$g(x) = \frac{3}{2}(2x + \varepsilon) - \frac{1}{2}\varepsilon \rightarrow g(x) = 3x - 1 \rightarrow f_{\log}(x) = 2(3x - 1) + \varepsilon = 4x + 2$$

4x + 2

$$f_{\log}(x) = 0 \rightarrow 4x + 2 = 0 \rightarrow x = -\frac{1}{2} \rightarrow a = -\frac{1}{2} \quad (2)$$

(2)

$$f(x) = 9^x$$

$$g(x) = \log_9 x$$

$$f_{\log}(x) = 9^{\log_9 x} = x^{\log_9 9} = x^1 = x$$

$$g_{\log}(x) = \log_9 9^x = \log_9 9^x = x$$

$$f_{\log}(x) \leq g_{\log}(x) \rightarrow$$

(4)

$$x^1 \leq x \rightarrow x^1 - x \leq 0 \rightarrow$$

$$x(x - 1) \leq 0$$

(2)

$$+ \quad | \quad - \quad | \quad + \rightarrow x \in [0, 1] \rightarrow \text{مجموعه}$$

$$f\left(\frac{x^r-r}{x}\right) = x^r + x - r - \frac{r}{x} + \frac{r}{x^r} \quad (V)$$

$$\frac{x^r-r}{x} = x - \frac{r}{x} \xrightarrow{\text{تقريب}} \left(x - \frac{r}{x}\right)^r = x^r - r + \frac{r}{x^r}$$

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

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

$$f(x) = x^r + x$$

$$f(x) = \log_p x \quad g(x) = -x^r + \Lambda x \quad (A)$$

$$\log_p(x) = \log_p(-x^r + \Lambda x) \rightarrow D_{f \circ g} = D_g, g(x) \in D_f = (0, \Lambda) = A$$

$$B = (-\infty, F)$$

$$R_{f \circ g} = \mathbb{R} \rightarrow A \cap B = (0, \Lambda) \rightarrow \text{مجال التعريف}$$

$$f \circ f(x) = 1 - x^r f^r(x) \rightarrow f(f(x)) = 1 - x^r f^r(x) \rightarrow f(x) = 1 - x^r$$

$$g(x) = x - 1$$

$$h(x) = x^r + rx + 1$$

$$h(g(x)) = f(x) \rightarrow x^r + rx + 1 = 1 - x^r \rightarrow x^r + rx - r = 0 \rightarrow x^r - r = -rx$$

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

$$h(g(x)) = f(x) \rightarrow x^r - r + rx - 1 + rx - 1 = 1 - x^r \rightarrow x^r + 2rx - r = 0 \rightarrow x^r - r = -2rx$$

$$1/r \neq 0$$

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

$$g \circ f(x) = ax^r + rx$$

$$g(r) = \Lambda$$

$$\rightarrow g\left(x - \frac{r}{x}\right) = ax^r + rx$$

$$x - \frac{r}{x} = r \rightarrow x^r - rx - r = 0 \rightarrow (x-r)(x+1) = 0 \rightarrow$$

$$\begin{cases} x = -1 \rightarrow -a - r = \Lambda \rightarrow a = -\Lambda - r \\ x = r \rightarrow ar + \Lambda = \Lambda \rightarrow a = 0 \end{cases}$$