

ثمنين 11
F, F, V, V

19, 170

نظر 10

No
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الف 1

$$D_{g \circ f} = \{x \mid x \in D_f, f(x) \in D_g\} \quad D_f: \begin{array}{l} x-1 > 0 \rightarrow x > 1 \quad I \\ \log_r(x-1) \geq 0 \rightarrow x-1 \geq 1 \rightarrow x \geq 2 \quad II \end{array}$$

$$III: x \in [r, +\infty), \sqrt{\log_r(x-1)} = r \rightarrow \log_r(x-1) = r^2 \rightarrow x-1 = r^{r^2} \rightarrow x = 1 + r^{r^2} \quad IV$$

$$D_g: \sqrt{-(x-2)^2} \geq 0 \rightarrow (x-2)^2 \leq 0 \rightarrow x = 2$$

$$III \cap IV = [r, +\infty) \cap \{1 + r^{r^2}\} = \{1 + r^{r^2}\} = D_{g \circ f}$$

$$g \circ f(x) = (rx - a)^r - r(rx - a) + 1 = rx^r - 4rx + 11$$

$$f \circ g(x) = r(x^r - 4x + 1) - a = rx^r - 4rx + 11$$

$$g \circ f(x) = f \circ g(x) \Rightarrow rx^r - 4rx + 11 = rx^r - 4rx + 11 \Rightarrow rx^r - 4rx + 11 = 0$$

$$x^r + \beta^r = \gamma^r \quad \begin{array}{l} S = \frac{-b}{a} \\ P = \frac{c}{a} \end{array} \rightarrow 11 - 4r = 4r$$

$$g \circ f(x) = g(rx) = ax^r + 11 \quad \begin{array}{l} rx = t \\ x = \frac{t}{r} \end{array} \rightarrow g(t) = \frac{a}{r} t^r + 11$$

$$\Rightarrow g(x) = \frac{a}{r} x^r + 11 \rightarrow g(x/r) = \frac{a}{r} (x/r)^r + 11 = \frac{a}{r^2} x^r - \frac{r}{r} x + \frac{11}{r}$$

$$x_s = -\frac{b}{ra} = -\frac{-\frac{r}{a}}{\frac{1}{r}} = r \rightarrow y_s = \min = g(0) = 11$$

$$f \circ g(x) = rx^r - 4x - 1, f(x) = rx - 1 \Rightarrow f \circ g = r \circ g - 1$$

$$rx^r - 4x - 1 = rx - 1 \Rightarrow g(x) = x^r - 2x + 1 = (x-1)^r$$

$$\Rightarrow g \circ f(x) = (rx - 1)^r = (rx - a)^r$$

$$f \circ g(x) = \frac{r}{a} x + r, f - g(x) = -x + a, g(x) = \frac{r}{r} f(x) - r - a$$

$$f - g(x) = f(x) - \frac{r}{r} f(x) + r = -x + a \Rightarrow -\frac{1}{r} f(x) = -x - r$$

$$\Rightarrow f(x) = rx + r, g(x) = \frac{r}{r} (rx + r) - r = rx - 1$$

$$f(g(x)) = r(rx - 1) + r = 4x + r = \frac{r}{a} x + r \rightarrow 4 = \frac{r}{a} \rightarrow a = \frac{r}{4}$$

$$f \circ g(x) = \log_r(g(x)) = \log_r(rx - 1) = \log_r(rx) = \log_r(r) + \log_r(x) = 1 + \log_r(x)$$

$$g \circ f(x) = \log_r(f(x)) = \log_r(rx - 1) = \log_r(rx) = \log_r(r) + \log_r(x) = 1 + \log_r(x)$$

$$f \circ g(x) = g \circ f(x) \Rightarrow \log_r(rx - 1) = \log_r(rx) \Rightarrow rx - 1 = rx \Rightarrow -1 = 0$$

$$Z: 0, 1, 2 \rightarrow 1, 2$$

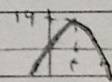
$$f\left(x - \frac{r}{x}\right) = \left(x^r - r + \frac{r}{x^r}\right) + \left(x - \frac{r}{x}\right) = \left(x - \frac{r}{x}\right)^r + \left(x - \frac{r}{x}\right) \quad \checkmark$$

$$\Rightarrow f(x) = x^r + x \quad \text{انفاق} \quad f(x) = x^r + x \quad \text{2}$$

$$D_{f \circ g} = \left\{ x \mid x \in Dg, g(x) \in Df \right\}, \quad D_f: x > 0, \quad D_g: \mathbb{R}$$

$$\mathbb{R} \cap \{x \mid x > 0\} = \mathbb{R}^+ = \{x \mid x > 0\}$$

$$D_{f \circ g} = (0, \infty) = A$$



$$R_{f \circ g}: x \rightarrow [g] \rightarrow g(x) \rightarrow [f] \rightarrow f(g(x)) \xrightarrow{f \circ g = g \circ f} \mathbb{R} \rightarrow [g] \rightarrow (-\infty, 19] \rightarrow [f] \rightarrow (-\infty, f]$$

= B

$0 < x \leq 14$
 $\log x \leq f$

$$A \cap B = (0, \infty) \cap (-\infty, f] = (0, f] \quad \checkmark$$

$$f(f(x)) = 1 - 3f'(x) \Rightarrow f(t) = 1 - 3t' \Rightarrow f(x) = 1 - 3x' \quad \text{9}$$

$$h(g(x)) = (x-1)^3 + 2(x-1) + 1 = x^3 - 3x^2 + 4x - 2$$

$$\Rightarrow h \circ g(x) = f(x) \Rightarrow x^3 - 3x^2 + 4x - 2 = 1 - 3x' \Rightarrow x^3 + 4x - 3 = 0$$

$$f'(x) = 3x^2 + 4 \Rightarrow \dots$$

$$g(f(x)) = ax^3 + 2x, \quad g(3) = 1 \Rightarrow f(x) = 3 = x - \frac{4}{x} \quad \text{10}$$

$$\Rightarrow x - \frac{4}{x} = 3 \Rightarrow x^2 - 3x - 4 = 0 \quad \begin{cases} x_1 = -1 \\ x_2 = 4 \end{cases}$$

$$\left\{ \begin{array}{l} x = -1 \rightarrow -a - 2 = 1 \Rightarrow a = -3 \\ x = 4 \rightarrow 4a + 1 = 1 \Rightarrow a = 0 \end{array} \right.$$

$$g(f(x)) \quad \left\{ \begin{array}{l} x = -1 \rightarrow -a - 2 = 1 \Rightarrow a = -3 \\ x = 4 \rightarrow 4a + 1 = 1 \Rightarrow a = 0 \end{array} \right.$$

$$f(x) = 3$$

$$g(3) = 1$$