

$$D_{g \circ f} = \{x \in D_f : f(x) \in D_g\}$$

$$f(x) = \sqrt{\log(x-1)}$$

$$g(x) = \sqrt{-x^2 + 4x - 4}$$

$$x \in D_f \rightarrow x-1 > 0 \quad \boxed{x > 1} \quad \text{I}$$

$$\log(x-1) \geq 0 \quad x-1 \geq 1 \quad \boxed{x \geq 2} \quad \text{II}$$

$$f(x) \in D_g$$

$$-x^2 + 4x - 4 \geq 0$$

$$x^2 - 4x + 4 \leq 0$$

$$(x-2)^2 \leq 0 \quad x=2$$

$$\sqrt{\log(x-1)} = 2$$

$$\log(x-1) = 4$$

$$x-1 = 14$$

$$\boxed{x = 15} \quad \text{III}$$

$$\text{I} \cap \text{II} \cap \text{III} \rightarrow \boxed{x = 15}$$

$$f \circ g(x) = \sqrt{(x^2 - 13x + 11) - 4} = \sqrt{x^2 - 13x + 7}$$

$$g \circ f(x) = (x^2 - 4)^2 - 2(x^2 - 4) + 1 = x^4 - 8x^2 + 16 - 2x^2 + 8 - 1 = x^4 - 10x^2 + 13$$

$$f \circ g(x) = g \circ f(x) \quad x^2 - 13x + 7 = x^4 - 10x^2 + 13$$

$$x^4 - 11x^2 + 6 = 0 \rightarrow x^2 = 11 \rightarrow x = \pm \sqrt{11}$$

$$f(x) = \sqrt{x} \quad x = t \quad x = \frac{t}{\sqrt{f}} \quad g \circ f(x) = \omega x^2 + 11$$

$$\omega \left(\frac{t}{\sqrt{f}}\right)^2 + 11 = \omega \left(\frac{t}{f}\right) + 11 = \frac{\omega + 11}{f} + 11 \quad g(x) = \frac{\omega}{f} x^2 + 11$$

$$g(x-v) = \frac{\omega}{f} (x-v)^2 + 11 = \frac{\omega}{f} (x^2 + 49 - 14x) + 11 = \frac{\omega}{f} x^2 + \frac{49\omega}{f} - \frac{14\omega}{f} x + 11$$

$$x=v \rightarrow \left(\frac{\omega}{f} \times 49\right) - \left(\frac{14\omega \times v}{f}\right) + \frac{49\omega}{f} = \frac{49\omega}{f} - \frac{14\omega v}{f} + \frac{49\omega}{f} = \frac{98\omega}{f} - \frac{14\omega v}{f}$$

$$f(x) = 3x - 4 \quad f \circ g(x) = 3x' - 4x - 1 \quad g \circ f(x) = ?$$

$$3g - f = 3x' - 4x - 1 \quad 3g = 3x' - 4x + 1 \quad g(x) = x' - 4x + 1$$

$$(3x - 4)' - 4(3x - 4) + 1 = 9x' + 12 - 12x - 4x + 1 + 1 = 9x' - 10x + 14$$

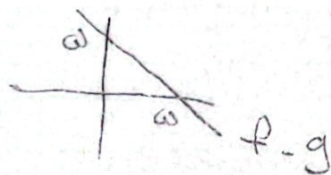
$$g \circ f(x) = 9x' + 10x + 14$$

⑤ $f(x) = ax + b \quad g(x) = cx + d$... $f \circ g$ و $g \circ f$ تابع خطی اند.

$$f \circ g(x) = 3f(x) - 1f \quad 1cx + 1d = 3ax + 3b - 1f \quad 1c = 3a \quad 1d = 3b - 1f$$

$$f - g = (a - c)x + (b - d)$$

$$f - g = -x + a$$



$$\text{شیب} = -1 \quad -x + a$$

$$a - c = -1 \quad b - d = a$$

$$a = c - 1 \quad 3a = 1c \quad 3(c - 1) = 1c$$

$$3c - 3 = 1c$$

$$\boxed{c = 3}$$

$$\boxed{a = 2}$$

$$b = d + a$$

$$1d = 3(d + a) - 1f$$

$$1d = 3d + 1a - 1f$$

$$1d = 3d + 1$$

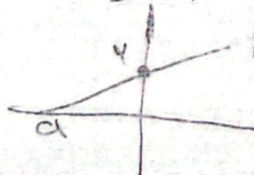
$$\boxed{d = -1}$$

$$\boxed{b = 1}$$

$$f(x) = 3x + 1$$

$$g(x) = 3x - 1$$

$$f \circ g(x) = 3(3x - 1) + 1 = 9x - 2 + 1 = 9x - 1$$



$$9x - 1 = 0 \quad 9x = 1$$

$$x = \frac{1}{9} = \frac{1}{3^2}$$

$$\boxed{a = \frac{1}{3^2}}$$

جواب آخر

$$f(x) = 9^x \quad g(x) = \log_3 x$$

$$f \circ g(x) = 9^{\log_3 x}$$

$$9^{\log_3 x} = x^{\log_3 9}$$

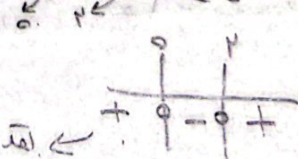
$$f \circ g(x) = x^2$$

$$f \circ g(x) \leq g \circ f(x) \rightarrow x^2 \leq 2x$$

$$x^2 - 2x \leq 0$$

$$x(x - 2) \leq 0$$

$$x(x - 2) \leq 0$$



جواب آخر $\{0, 2\}$ ← مقادیر صحت دارد $x^2 =$

$$f\left(\frac{x^2-1}{x}\right) = x^2 + x - \frac{1}{x} + \frac{1}{x^2} \quad f(x) = ?$$

$$f\left(x - \frac{1}{x}\right) = \left(x - \frac{1}{x}\right) + \left(x^2 + \frac{1}{x^2} - f\right) \quad x - \frac{1}{x} = t$$

$$f(t) = t + (t^2) \quad \boxed{f(x) = x^2 + x}$$

$$A = D_{f \circ g} \rightarrow x \in D_g : g(x) \in D_f \quad D_g = \mathbb{R} \quad D_f \rightarrow x > 0 \quad \textcircled{1}$$

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

$$A = \{1, 2, 3, 4, 5, 6, 7\}$$

$$f \circ g(x) = \log_p(1x - x^2) \quad R_{f \circ g} = \mathbb{B}$$

$$\frac{-x^2 + 1x}{\text{Max}} \rightarrow \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2}$$

$$(-\infty, \frac{1}{2}]$$

$$\log_p(1x - x^2)$$

چون در $\log$ قرائی بزرگتر باشد،
تغییرات $1x - x^2$ شود $(0, \frac{1}{2}]$

$$R_{f \circ g(x)} \rightarrow (-\infty, \frac{1}{2}] \quad B = (-\infty, \frac{1}{2}] \quad A \cap B \xrightarrow{x \in \mathbb{Z}}$$

$$\{1, 2, 3, 4\} \Rightarrow \text{با ۴ عضو صحیح است.}$$

$$f \circ f(x) = f(f(x)) \quad x \xrightarrow{f} f(x) \xrightarrow{f} 1 - 3f^2(x)$$

$$f(x) = 1 - 3x^2 \quad h(g(x)) = (x-1)^2 + 2(x-1) + 1 = x^2 - 3x^2 + 3x - 1$$

$$+ 2x - 1 + 1 = x^2 - 3x^2 + 3x - 1 \quad h(g(x)) = f(x)$$

$$x^2 - 3x^2 + 3x - 1 = 1 - 3x^2$$

$$x^2 + 3x - 3 = 0$$

$$x \approx \frac{56}{100}$$

یک
دانش

$$f(x) = x - \frac{f}{x} \quad g \circ f(x) = ax^3 + px \quad g(3) = 1 \quad a = p$$

$$x - \frac{f}{x} = 3 \quad \frac{x^2 - f}{x} = 3 \quad x^2 - f = 3x \quad x^2 - 3x - f = 0 \quad (x-3)(x+1) = 0$$

$$f(x) \begin{cases} x=3 \rightarrow 3 \rightarrow g \circ f(x) = 1 \\ x=-1 \rightarrow 3 \rightarrow g \circ f(x) = 1 \end{cases}$$

$$9a + 1 = 1 \quad a = 0$$

$$-a - 3 = 1 \quad -a = 4 \quad a = -4$$