(سوال ۱)

$gof(x) \rightarrow x \in D_f \quad f(x) \in D_g$

$f(x) = \sqrt{\log_2^{x-1}} \rightarrow x-1 > 0 \rightarrow \boxed{x > 1}$

$\log_2^{x-1} \geq 0 \rightarrow x-1 \geq 1 \rightarrow \boxed{x \geq 2}$

$\cap \ \boxed{x \geq 2}$

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

$\cap \ \{2\}$ → (2)

(سوال ۲)

$f(x) = 2x-5$

$g(x) = x^2-3x+8$

$f(g(x)) = 2(x^2-3x+8)-5$

$gof = g(f(x)) = (2x-5)^2 - 3(2x-5) + 8$

~~$2x^2 - 6x + 16 - 5 = 4x^2 + 25 - 20x - 6x + 15 + 8$~~

$-6x \quad 11 \quad 2x^2 \quad -26x \quad 48$

$-20x$

$2x^2 - 20x + 37 \qquad \alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta$

$\alpha + \beta = \frac{-b}{a} = \frac{20}{2} = 10 \qquad (10)^2 - 2 \times \frac{37}{2} = 100 - 37 = (63)$

(سوال ۳)

$g(f(x)) = 5x^2+11 \qquad f(x) = 2x \rightarrow 2x = t \rightarrow x = \frac{t}{2}$

$5\left(\frac{t}{2}\right)^2 + 11 \rightarrow \frac{5t^2}{4} + 11 \rightarrow \frac{5(x-7)^2}{4} + 11$

$\frac{5(x^2+49-14x)+44}{4} \rightarrow \frac{5x^2+245-70x+44}{4} \rightarrow \boxed{\frac{5x^2-70x+289}{4}}$

$-\frac{b}{2a} \rightarrow \frac{70}{10} = (7) \qquad \frac{5(7)^2 - 70(7) + 289}{4} = \frac{245 - 490 + 289}{4} = (11)$

سوال ۴

$f(x) = 3x - 4$

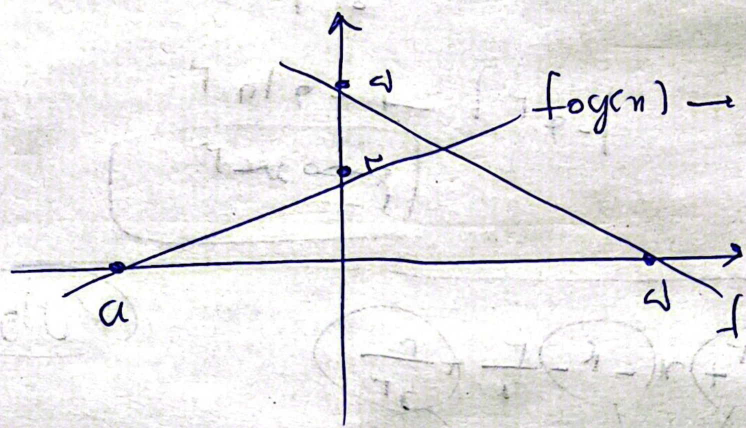
$fog(x) = 3x^2 - 6x - 1 \qquad 3g(x) - 4 = 3x^2 - 6x - 1$

$3g(x) = 3x^2 - 6x + 3 \longrightarrow g(x) = x^2 - 2x + 1$

$g(x) = (x-1)^2$

$g(f(x)) = g(3x - 4 - 1)^2 \longrightarrow \boxed{9x^2 + 25 - 30x}$

سوال ۵



$fog(x) \rightarrow (0,2)\ (a,0)$

$\boxed{y = \frac{2}{a}x + 2}$

$f-g \quad (0,5)\ (5,0)$

$\frac{5-0}{0-5} = -1$

$\boxed{y = -x + 5}$

$2g(x) = 3f(x) - 14$

$f - g = -x + 5 \longrightarrow f(x) - g(x) = 5 - x \xrightarrow{\times -2}$

$3f(x) - 2g(x) = 14$

$\left.\begin{array}{l} -2f(x) + 2g(x) = -10 + 2x \\ 3f(x) - 2g(x) = 14 \end{array}\right\} \boxed{f(x) = 2x + 4}$

$g(x) = f(x) - 5 + x \rightarrow \boxed{3x - 1}$

$\left.\begin{array}{l} f(x) = 2x + 4 \\ g(x) = 3x - 1 \end{array}\right\} fog(x) = 2(3x - 1) = 6x + 2$

$f(g(x)) = \frac{2}{a}x + 2 = 6x + 2 \rightarrow \frac{2}{a} = 6 \rightarrow \boxed{a = \frac{1}{3}}$

سوال ۹

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

$f(g(x)) \quad 9^{\log_3 x} \rightarrow x^{\log_3 9} = x^2$

$g(f(x)) \rightarrow \log_3 9^x \rightarrow x \times 2 = 2x$

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

$0 \quad 2$

$+ \mid_0 \; - \; \mid_2 +$

$[0, 2] \rightarrow$ ۰ و ۱ و ۲

۳ عدد صحیح

سوال ۷

$f\left[\frac{x^2 - 2}{x}\right] = x^2 + x - 4 - \frac{2}{x} + \frac{4}{x^2}$

$x - \frac{2}{x} \xrightarrow{\text{توان } 2} x^2 + \frac{4}{x^2} - 4$

$f(x) = t^2 + t \rightarrow f(x) = x^2 + x$

سوال ۸

$f(x) = \log_2 x \quad (x > 0) \qquad g(x) = 8x - x^2$

$fog \rightarrow f(g(x)) \rightarrow \log_2 (8x - x^2)$

$8x - x^2 > 0 \rightarrow x^2 - 8x < 0 \rightarrow x(x-8) < 0$

$+ \mid_0 - \mid_8 + \quad (0, 8) \; D_g$

$D_f \cap D_g \rightarrow (0, 8)$

$R_{fog} \to fog = \log_2^{8x-x^2}$ $\quad y = \frac{3}{x} - x \quad \frac{3}{x} - x = f(x)$

$\log_2^{8x-x^2} = \log_2^{16-(x-4)^2} \to 8x - x^2 = -(x^2-8x)$

$-((x-4)^2-16) = 16-(x-4)^2 \to 0<x<8$

$-4<x-4<4 \to 0<(x-4)^2<16 \quad -16< -(x-4)^2<0$

$R_{fog} = (0,4]$ B $\quad A = (0,8) \quad A\cap B = (0,4] \to \{1,2,3,4\}$

$fof(x) = 1-2f^2(x) \to f(x) = t$ (۹ وله)

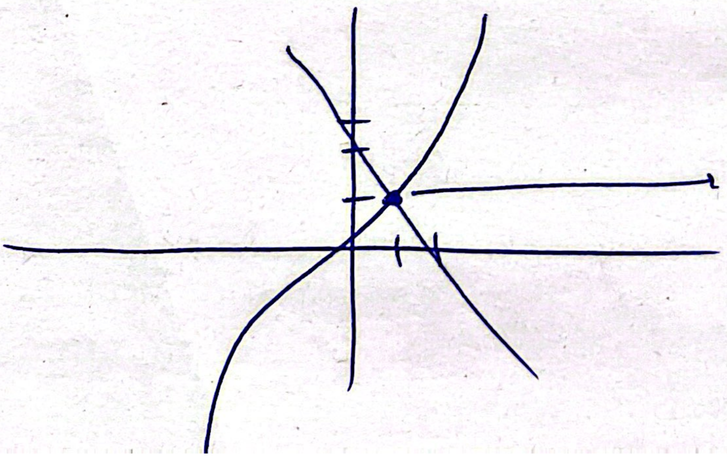
$g(x) = x-1 \quad f(t) = 1-2t^2 \to f(x) = 1-2x^2$

$h(x) = x^3+3x+1$

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

$= x^3-3x^2+6x-3 = 1-2x^2 \to x^3+6x-4=0$

$x^3 = 4-6x$



یک ریشه دارد

$f(x) = x - \frac{4}{x}$ $\quad x - \frac{4}{x} = 3$

$\frac{x^2-4}{x} = 3 \rightarrow x^2 - 4 = 3x \rightarrow x^2 - 3x - 4 = 0$

$(x-4)(x+1) = 0$ $\quad 4 \quad -1$

$gof(-1) = -a - 2 = 8$

$-a = 10$

$a = -10$

$gof(4) = 16a + 8 = 8 \rightarrow a = 0$

$a = -10 , 0$

فاطمه

[illegible]

دوازدهم

[illegible]