۱۸,۷۵

$g\circ f(x)$ — $x \in D_f$, $f(x) \in D_g$ (سؤال ۱)

$f(x) = \sqrt{\log_2^{x-1}}$ → $x-1>0$ → $x>1$ (۱)

$D_g = \{2\}$

$D_g : x \geq 2$

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

∩ $x \geq 2$

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

$f(x) \in D_g$ → $\sqrt{\log_2^{x-1}} = 2$ → $x=17$ ∩ (۲)

$D_{g\circ f} = \{17\}$

$f(x) = 2x-5$ (سؤال ۲)

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

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

~~$2x^2 - 6x + 16 - 5$~~ = ~~$4x^2$~~ + 25 − ~~20x~~ − 6x + 15 + 8 (۲)

−6x 11 $2x^2$ −24x 40 , 43

−20x

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

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

$g(f(x)) = 5x^2+11$ $f(x) = 2x$ → $2x = t$ → $x = \frac{t}{2}$ (سؤال ۳)

$5(\frac{t}{2})^2+11$ → $\frac{5t^2}{4}+11$ → $\frac{5(x-7)^2}{4}+11$ (۲)

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

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

سوال ۴

$f(x)=3x-4$

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

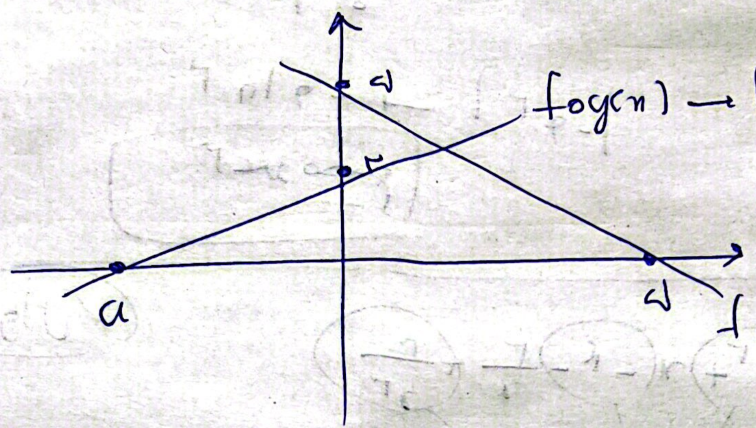
$3g(x)=3x^2-6x+3 \longrightarrow g(x)=x^2-2x+1$

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

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

۲

سوال ۵



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

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

$f-g \quad [5,0]\,[0,5]$

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

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

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

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

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

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

۱/۷۵

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

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

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

$-\frac{2}{a}x+2=6x+2$ طبق شکل a باید منفی باشد

$a=-\frac{1}{3}$

(سوال ۹)

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

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

(۳)

$g(f(x)) \to \log_3^{9^x} \to x \times 2 = 2x$

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

$0 \quad 2$

$+ \; | \; - \; | \; +$ (0 … 2)

$[0, 2] \to$ ۰ و ۱ و ۲

۳ عدد صحیح

(سوال ۷)

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

$x - \frac{2}{x} \xrightarrow{\text{توان ۲}} x^2 + \frac{4}{x^2} - 4$

(۳)

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

(سوال ۸)

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

$fog \to f(g(x)) \to \log_2^{8x - x^2}$

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

$+ \; | \; - \; | \; +$ (0 … 8) $\quad (0, 8) \; D_g$

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

$R_{fog} \to fog = \log_2^{8x-x^2}$

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

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

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

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

(۲)

$fof(x) = 1-2f^2(x) \to f(x)=t$ (دی ۹۵)

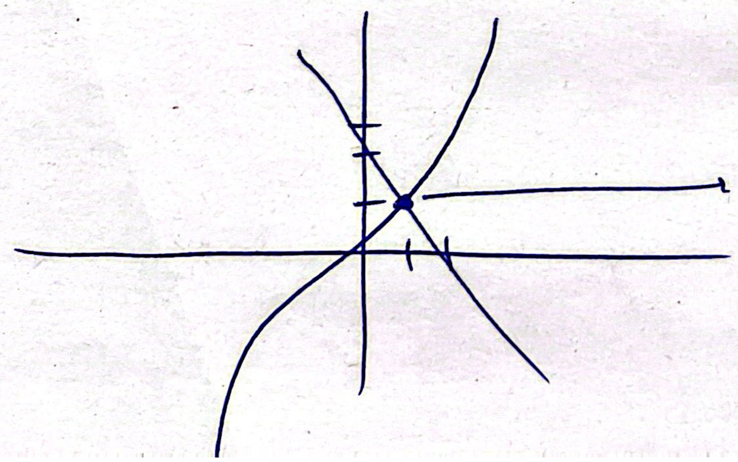
$g(x) = x-1$ $\quad f(t) = 1-2t^2 \to f(x) = 1-2x^2$

$h(x) = x^3+3x+1$ (۲)

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

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

$x^3 = 3-6x$



یک ریشه دارد

۲

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

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

$(x-4)(x+1) = 0$; 4 , -1

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

$-a = 10$

$a = -10$

$gof(4) = 94a + 8 = 8 \rightarrow a = 0$

$a = -10 , 0$

فاطمه

کیانا

دوازدهم

ریاضی