مهرنیا ریاضی — دوازدهم تجربی B

$g(x)=\sqrt{-x^2+4x-4}$ $\quad f(x)=\sqrt{\log_2^{(x-1)}}$ $\quad D_{gof(x)}=?$ همواره منفی پس زیر رادیکال باید صفر شود $g(x)=\sqrt{-(x^2-4x+4)}=\sqrt{-(x-2)^2} \longrightarrow -(x-2)^2 \geq 0 \longrightarrow x-2=0 \quad x=2$ $g(f(x))=\sqrt{-(\sqrt{\log_2^{(x-1)}}-2)^2} \longrightarrow \sqrt{\log_2^{(x-1)}}=2 \quad x-1=16 \quad x=17$	1
$f(x)=2x-5 \qquad g(x)=x^2-3x+8$ $fog(x)=gof(x) \longrightarrow f(g(x))=g(f(x)) \longrightarrow 4x^2-26x+48=2x^2-6x+11$ $2x^2-20x+37=0 \qquad \alpha^2+\beta^2=S^2-2P \qquad S=\frac{-b}{a}=10 \quad P=\frac{c}{a}=\frac{37}{2}$ $\alpha^2+\beta^2=100-2(\frac{37}{2})=100-37=63$	2
$gof(x)=5x^2+11 \qquad f(x)=2x \qquad g(x-7)=\frac{5(x-7)^2}{4}+11$ $f: \; 2x=t \quad x=\frac{t}{2} \qquad g(\frac{t}{2})=\frac{5t^2}{4}+11 \rightarrow g(x)=\frac{5x^2}{4}+11 \qquad g(x-7)=\frac{5(x-7)^2}{4}+11$ $\xrightarrow[x=7]{min} \frac{5(7-7)^2}{4}+11=11$	3
$f(x)=3x-4 \qquad fog(x)=3x^2-6x-1 \qquad gof(x)=?$ $g(x)=x^2-2x+1$ $g(x)=(x-1)^2$ $g(f(x))=(3x-4-1)^2=(3x-5)^2=9x^2-30x+25$	4
$\begin{cases} f(x)-g(x)=-x+5 \\ 2g(x)-3f(x)=-14 \end{cases} \longrightarrow \begin{matrix} f(x)=2x+4 \\ g(x)=3x-1 \end{matrix} \qquad fog(x)=f(g(x))=6x+2$ $6(a)+2=0 \qquad 6a=-2 \qquad a=\frac{-2}{6}=\frac{-1}{3}$	5

$f(x)=9^x \qquad g(x)=\log_3 x \qquad f\circ g(x)\leq g\circ f(x) \qquad \log_3 x \rightarrow x>0 \quad \mathrm{I}$ ۶

$f(g(x))=9^{\log_3 x}=x^{\log_3 9}=x^2 \;/\; g(f(x))=2x=\log_3 9^x$ $\quad \mathrm{I}\cap\mathrm{II}$

$x^2\leq 2x \qquad x^2-2x\leq 0 \qquad x(x-2)\leq 0$ $\quad \begin{array}{ccccc} & 0 & & 2 & \\ + & & - & & + \end{array}$ II $\quad (0,2]$

۲ عدد صحیح

$f\left(\frac{x^2-2}{x}\right)=x^2+x-4-\frac{2}{x}+\frac{4}{x^2}$ ۷

$f\left(x-\frac{2}{x}\right)=x^2+\frac{4}{x^2}-4+x-\frac{2}{x}=\left(x-\frac{2}{x}\right)^2+\left(x-\frac{2}{x}\right)$

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

$f(x)=\log_2 x \qquad g(x)=8x-x^2 \qquad D_{fog}=A \qquad R_{fog}=B$ ۸

$\begin{array}{ccccc} & 0 & & 8 & \\ + & & - & & + \end{array}$

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

$x(x-8)<0 \qquad D_{fog}=(0,8)=A$

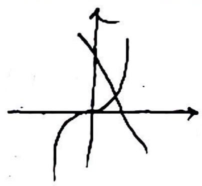
$\frac{-b}{2a}=\frac{-8}{-2}=4 \xrightarrow{x=4} \log_2^{32-16}=4$

$-x^2+8x=-(x-4)^2+16 \qquad 0<x<8 \qquad -4<x-4<4 \qquad 0\leq(x-4)^2<16$

$-16<-(x-4)^2\leq 0 \qquad 0<-(x-4)^2+16\leq 16$

$R \quad (0,16] \xrightarrow{\log_2} (0,4]=B \qquad A\cap B=(0,4]\cap(0,8)=(0,4] \rightarrow$ ۴ عدد صحیح

$fof(x)=1-3f^2(x) \qquad g(x)=x-1 \qquad h(x)=x^3+2x+1$ ۹



$f(x)=1-3x^2 \qquad h(g(x))=f(x) \rightarrow x^3-3x^2+5x-2=1-3x^2$

$h(g(x))=(x-1)^3+2(x-1)+1=x^3-3x^2+3x+2x-2$ $\quad x^3+5x-3=0$

یک ریشه دارد $\quad x^3=3-5x$

$f(x)=x-\frac{4}{x} \qquad gof(x)=ax^3+2x \qquad g(3)=8$ ۱۰

$f(4)=4-\frac{4}{4}=3 \qquad g(f(4))=g(3)=8 \Rightarrow 64a+8=8 \qquad 64a=0 \qquad a=0$

$f(x)=3 \qquad \frac{x^2-4}{x}=3 \qquad (x-4)(x+1)=0$

$\qquad x=4 \qquad x=-1$

$g(f(-1))=8=ax^3+2x \qquad -a-2=8 \qquad a=-10$