پارسا ولیئی [illegible] هاشمی A

۱- $f(x)=\sqrt{\log_2^{x-1}}$ $\quad g(x)=\sqrt{-x^2+4x-4}$

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

$\Rightarrow gof(x)=\sqrt{-(\sqrt{\log_2^{x-1}}-2)^2} \Rightarrow (\sqrt{\log_2^{x-1}}-2)^2 \le 0$

$\Rightarrow \log_2^{x-1}=4 \Rightarrow x-1=16 \Rightarrow x=17$

$\Rightarrow D_{gof}=\{17\}$

۲- $f(x)=2x-5$, $g(x)=x^2-3x+8 \Rightarrow fog=2(x^2-3x+8)-5$

$\xrightarrow{gof} g(2x-5)=(2x-5)^2-\cancel{3(2x-5)}+8$

$4x^2-20x+25-6x+15=4x^2-26x+48$

$\xrightarrow{gof(x)}$ $fog(x)=gof(x) \Rightarrow 4x^2-26x+48=$

$2x^2-6x+11 \Rightarrow 2x^2-20x+37=0 \Rightarrow \alpha^2+\beta^2$

$\Rightarrow S^2-2P=100-37=63 \Rightarrow 63$

۳- $gof(x)=g(2x)=5x^2+11$, $2x=t \Rightarrow x=\frac{t}{2}$

$\Rightarrow 5x^2+11=\frac{5t^2}{4}+11=g(t) \Rightarrow g(x)=\frac{5x^2}{4}+11$

$g(x-7) = \dfrac{5(x-7)^2}{4} + 11 = \dfrac{5x^2 - 70x + 289}{4}$

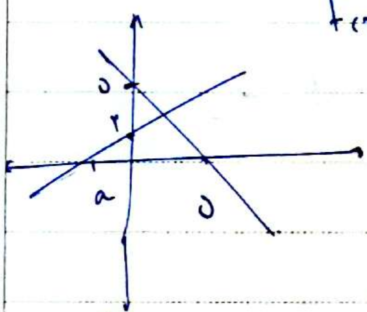
$-\dfrac{b}{2a} = 7 \xrightarrow{x=7}$ مقدار min $\Rightarrow \dfrac{44}{4} = 11$

۴_ $f(x) = 3x - 4 \ , \ f \circ g(x) = 3(x^2 - 2x)$

$\Rightarrow 3g - 4 = 3x^2 - 6x - 1 \Rightarrow g = x^2 - 2x + 1$

$\Rightarrow g \circ f(x) = \underbrace{(3x-4)^2 - 2(3x-4)}_{9x^2 - 24x + 16 \ - 6x + 8} + 1 = 9x^2 - \cancel{30x}\ 30x + 25$

۵_ $f(x) - g(x) = -x + 5 \Rightarrow 2f(x) - 2g(x) =$



$-2x + 10 \ , \ 3f(x) - 2g(x) = \{$

$\xRightarrow{\text{حل دستگاه}} f(x) = 2x + 4 \ , \ g(x) = 3x - 1 \ ,$

$-\dfrac{2}{a}x + 2$

$\Rightarrow f \circ g(x) = 6x + 2 \Longrightarrow -\dfrac{2}{a} = 6 \Rightarrow a = -\dfrac{1}{3}$

۶_ $f(x) = 9^x \ , \ g(x) = \log_3 x \Rightarrow f \circ g(x) = 9^{\log_3 x} = x^2$

$g \circ f(x) = \log_3 9^x = 2x \Rightarrow g \circ f(x) \geq f \circ g(x)$

$\Rightarrow x(2-x) \geq 0$ $\dfrac{\text{تعیین}}{\text{علامت}}$ $\underset{-\quad +\quad -}{\overset{0 \qquad 2}{\longleftrightarrow}} \Rightarrow [0, 2]$

PAPCO

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

$\left(x-\frac{2}{x}\right)^2$

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

8- $f(x) = \log_2 x \ , \ g(x) = 8x - x^2 \ , \ f\circ g(x) = f(8x - x^2)$

$= \log_2 (8x - x^2) \Rightarrow 8x - x^2 > 0 \Rightarrow$ $\overset{0 \quad 8}{- \quad + \quad -}$

$D_{f\circ g} = (0,8) \ , \ \frac{-b}{2a} = 4 \overset{x=4}{\Rightarrow} \log_2 16 = 4 \Rightarrow max$

$\Rightarrow R_{f\circ g} = (-\infty, 4] \Rightarrow R \cap D = (0,4]$

$\Rightarrow$ گزینه ۴

9- $f(f(x)) = 1 - 3f^2(x) \Rightarrow f(x) = 1 - 3x^2$

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

$= 1 - 3x^2 \Rightarrow x^3 + 6x - 3 = 0 \longrightarrow$ غلط

10- $\log_2 a = \log_a 3b \ , \ \log_a \frac{ab}{x} = \log_2 a \Rightarrow x - \frac{4}{x} = 3$

$x^2 - 3x - 4 \rightarrow (x-4)(x+1) \Rightarrow$ if $x=-1 \Rightarrow a=-1$

$x=4 \quad a=-1$ if $x=-4 \Rightarrow a=0$