تمرین ها

SUBJECT:

Year: Month: Day: Page : ( )

① $gof_{(x)}$ $\qquad D_{gof} = \{x \in D_f \mid f_{(x)} \in D_g\}$

$f_{(x)} = \sqrt{\log_2^{(x-1)}}$ $\qquad D_{gof} = \{x \in [2,+\infty) \mid f_{(x)} \in \{2\}\}$

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

$D_f = \begin{cases} x-1>0 \Rightarrow x>1 \\ \log_2^{x-1} \geq 0 \Rightarrow x-1 \geq 1 \Rightarrow x \geq 2 \end{cases} \Rightarrow D_f = [2,+\infty)$

$\to -(x^2-4x+4) \Rightarrow -(x-2)^2 \geq 0 \Rightarrow \underset{-\quad\quad -}{\overset{2}{\quad}} \Rightarrow D_g = \{2\}$

$D_{gof} = \{2\}$

---

② $f_{(x)} = 2x-5 \qquad \to fog \to 2(x^2-3x+8)-5 \Rightarrow$

$g_{(x)} = x^2-3x+8 \qquad\qquad 2x^2-6x+11$

$gof \to (2x-5)^2 - 3(2x-5)+8 \Rightarrow 4x^2+25-20x-6x+23$

$4x^2-26x+48$

$fog = gof \Rightarrow 2x^2-6x+11 = 4x^2-26x+48 \Rightarrow 2x^2-20x+37$

$\alpha^2+\beta^2 \to S^2-2P \Rightarrow \left(\frac{-b}{a}\right)^2 - 2\left(\frac{c}{a}\right) \Rightarrow \left(\frac{20}{2}\right)^2 - 2\left(\frac{37}{2}\right) =$

$100-37 = \underline{\underline{63}}$

(3)

$gof_{(x)}=5x^2+11 \qquad f_{(x)}=2x$

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

$\Rightarrow g(t)=\frac{5t^2}{4}+11 \xRightarrow{t=x} g(x)=\frac{5x^2}{4}+11 \longrightarrow g(x-7)=?$

$g(x-7)=\frac{5(x-7)^2}{4}+11 \Rightarrow \frac{5x^2+245-70x}{4}+11 \Rightarrow$

$g(x-7)=5x^2-70x+\overset{289}{245\cancel{+44}} \longrightarrow \frac{-b}{2a}=\frac{70}{10}=7$

4

$5\times 49-\overset{490}{\cancel{70\times 7}}+289=245+289-490=44\div 4=11$ کمترین مقدار

(4)

$f_{(x)}=3x-4 \longrightarrow 3g-4=3x^2-6x-1 \Rightarrow$

$fog=3x^2-6x-1 \qquad \frac{3x^2-6x-1+4}{3} \Rightarrow \frac{3x^2-6x+3}{3}=x^2-2x+1$

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

$gof \longrightarrow (3x-4)^2-2(3x-4)+1 \Rightarrow 9x^2+16-24x-6x+8+1 \Rightarrow$

$9x^2-30x+25=(3x-5)^2=gof_{(x)}$

(۵)

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

$3f(x) = 2g(x) + 14 \Rightarrow f(x) = \dfrac{2g(x)+14}{3} \longrightarrow$

$f-g \Rightarrow \dfrac{2g(x)+14}{3} - g(x) \Rightarrow 2g(x)+14-3g(x) = 6$

$-g(x)+14 = -x+5 \Rightarrow -g(x) = -x-9 \Rightarrow \boxed{g(x) = \dfrac{x+9}{3}}$

$f-g$ نمودار از شکل $\Rightarrow (0,5)\ (5,0) \quad ax+5 \Rightarrow 5a+5=0 \Rightarrow a=-1 \Rightarrow -x+5$

$f(x) = \dfrac{2g(x)+14}{3} \Rightarrow \dfrac{2\left(\frac{x+9}{3}\right)+14}{3} \Rightarrow \dfrac{2}{9}x + 2 + \dfrac{14}{3} \Rightarrow$

$f(x) = \dfrac{2}{9}x + \dfrac{20}{3} \longrightarrow fog \rightarrow \dfrac{2}{9}\left(\dfrac{x+9}{3}\right) + \dfrac{20}{3} \Rightarrow \dfrac{2x+18}{27} + \dfrac{20}{3}$

$\dfrac{2x+18+180}{27} = \dfrac{2x+198}{27} = 0 \Rightarrow 2x = -198 \Rightarrow x = -99$

---

(۴)

$f(x) = 9^x \qquad fog(x) \leq gof(x) \quad x>0$

$g(x) = \log_3^x \qquad fog = 9^{\log_3^x} \Rightarrow x^{\log_3^9} \Rightarrow x^2$

$gof \Rightarrow \log_3^{9^x} \Rightarrow x\log_3^9 \Rightarrow 2x$

$x^2 \leq 2x \Rightarrow x^2 - 2x \leq 0 \qquad + \ 0 \ - \ 2 \ +$

$\hookrightarrow 1,2 \rightarrow$ ۲ عدد

۷

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

$x-\frac{2}{x}=t \to x^2+\frac{4}{x^2}-4=t^2+t$

$f(t)=t^2+t \Rightarrow f_{(x)}=x^2+x$

۸

$f_{(x)}=\log_2^x \qquad g(x)=8x-x^2$

$fog \to \log_2^{8x-x^2} \Longrightarrow D_{fog}=8x-x^2>0 \Rightarrow \underset{0}{-}\ \ +\ \ \underset{8}{-} \downarrow A$

$R_{fog} \Rightarrow \log_2^{8x-x^2} \to (-\infty,4] \to B$

$x=4$

$\log_2^{16}=4$

$A\cap B \to 1,2,3,4 \to$ جواب ۴

۹

$fof=1-3f^2_{(x)} \qquad g(x)\ x-1$

$h(x)=x^3+2x+1 \qquad hog_{(x)}=f_{(x)}$

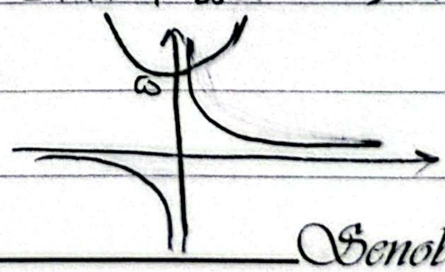
$f(f_{(x)})=1-3f^2_{(x)} \to f_{(x)}=1-3x^2$

$h(g_{(x)})=(x-1)^3+2(x-1)+1=x^3-3x^2+3x-1+2x-2+1=$

x^3-3x^2+5x-2

$h(g_{(x)})=f_{(x)} \to 1-3x^2=x^3-3x^2+5x-2 \to x^3+5x=3$

$\to x(x^2+5)=3 \to x^2+5=\frac{3}{x}$



SUBJECT:

Year: Month: Day: Page : ( )

$f(x) = x - \frac{4}{x} \longrightarrow x - \frac{4}{x} = 3 \Rightarrow x^2 - 4 = 3x \Rightarrow$ 10

$g \circ f = ax^3 + 2x$

$x^2 - 3x - 4 = 0$

$g(3) = 8$

$(x - \cancel{3}4)(x+1)$

$x = 4 , -1$

$\xrightarrow[y=8]{x=4} 64a + 8 = 8 \Rightarrow a = 0$

$\xrightarrow[y=8]{x=-1} -a - 2 = 8 \longrightarrow -a = 10 \Rightarrow a = -10$