آیدا ناصرای
دوازدهم دختران B
تکلیف ۸

۱

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

$Df(x)=\log_2^{x-1}\geq 0 \quad x-1\geq 1 \quad x\geq 2$

$x-1>0 \quad x>1$

$D = x\geq 2$

$Dgof \rightarrow x\in Df \,/\, f(x)\in Dg$

$x\geq 2 \quad \sqrt{\log_2^{x-1}}=2$

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

$x=17$

اشتراک $\rightarrow x=17$

$-x^2+4x-4\geq 0$

$x^2-4x+4\leq 0$

$(x-2)^2\leq 0 \quad x=2$

2

$- \quad 0 \quad -$

۲

$f(x)=2x-5$

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

$fog(x)=gof(x)$

$fog \rightarrow 2x^2-6x+16-5 \quad 2x^2-6x+11$

$gof \rightarrow (2x-5)^2-3(2x-5)+8 \quad 4x^2+25-20x-6x+15+8$

$4x^2-26x+48$

$\cancel{2x^2}-\cancel{6x}+11=\cancel{4x^2}-\cancel{26x}+48$

$2x^2-20x+37=0$

$400-4(2)(37)$ $\quad 74 \quad 296$

$400-296=104$

$\frac{20+\sqrt{104}}{4} \quad \frac{20-\sqrt{104}}{4}$

208

$\frac{400+104+40\sqrt{104}}{16}+\frac{400+104-40\sqrt{104}}{16}$

$\frac{1008}{16}=63$

۳

$gof=5x^2+11 \quad 5\left(\frac{x^2}{4}\right)+11 \quad \frac{5x^2}{4}+11\rightarrow g(x)$

$f(x)=2x \quad 2x=t \quad x=\frac{t}{2}$

$g(x-7)$ صعودها $7+$

$\frac{5(x+7)^2}{4}+11 \quad \frac{5(x^2+49+14x)}{4}+11 \quad \frac{5x^2+245+70x+44}{4}$

$\frac{5\times 49-490+289}{4}=11$ کمترین مقدار

$\frac{5x^2+70x+289}{4}=0 \quad \frac{-b}{2a}=\frac{\frac{-70}{4}}{\frac{10}{4}}=-7$

۴

$f(x)=3x-4$

$fog=3x^2-6x-1$

$gof\rightarrow$

$3g-4=3x^2-6x-1$

$3g=3x^2-6x+3$

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

$gof\rightarrow(3x-4)^2-2(3x-4)+1$

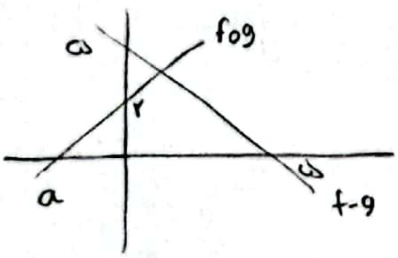
$9x^2+16-24x-6x+8+1$

$gof\rightarrow 9x^2-30x+25=0$

۵

$f-g=-x+5$

$fog=\frac{2}{a}x+2$



$\begin{array}{c|c} 5 & 0 \\ 0 & 5 \end{array} \quad -x+5$

$\begin{array}{c|c} -a & 0 \\ 0 & 2 \end{array} \quad \frac{2}{a}x+2$

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

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

$2f(x)-2g(x)=-2x+10 \quad fog\rightarrow 2(3x-1)+4$

$-f(x)=-2x-4 \quad f(x)=2x+4 \quad g(x)=3x-1$

$6x+2=\frac{2}{a}x+2 \quad 6=\frac{2}{a} \quad a=\frac{1}{3}$

$2g(x)-6x-12=-14$

$2g=-14+6x+12 \quad 2g=6x-2 \quad g=3x-1$

$\boxed{۶}$

$f(x) = 9^x$

$g(x) = \log_3^x$

$fog \leq gof$

$9^{\log_3^x} \leq \cancel{\log_3^{9^x}}\ 2x \quad \log_3^{3^{2x}} =$

$9^{\log_3^x} \leq 2x$

$\log_9^{2x} \geq \log_3^x \qquad \frac{1}{2}\log_3^{2x} \geq \log_3^x$

$(2x)^{\frac{1}{2}} \geq x \qquad \sqrt{2x} \geq x \qquad x^2 - 2x \leq 0$

$2x \geq x^2 \qquad x(x-2) \leq 0$

$$\begin{array}{ccccc} & 0 & & 2 & \\ + & & - & & + \end{array}$$

۰ و ۱، ۲

۳ عدد صحیح

$\boxed{۷}$

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

$x - \frac{2}{x} = t \qquad \underbrace{x^2 + \frac{4}{x^2} - 4}\ + x - \frac{2}{x} \rightarrow t^2 + t \qquad f(x) = x^2 + x$

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

$\boxed{۸}$

$f(x) = \log_2^x$

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

$fog \rightarrow x \in D_g \,/\, g(x) \in D_f$

$R \qquad 8x - x^2 > 0$

$D_{fog} = (0, 8)$

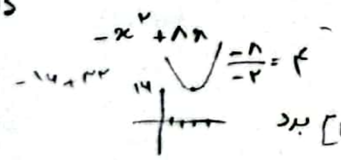
$R_{fog} = [4, +\infty)$

$A \cap B = [4, 8)$

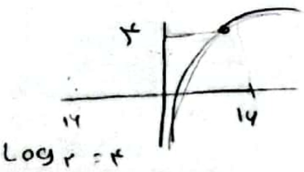
$A \cap B$

$x > 0$

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



برد $[16, +\infty)$



۷، ۶، ۵، ۴

۴ عدد صحیح

$\boxed{۹}$

$f(x) = 1 - 3x^2$

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

$g(x) = x - 1$

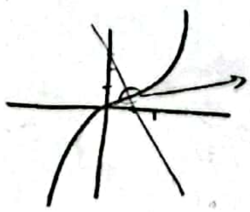
$(x-1)^3 + 2(x-1) + 1 = 1 - 3x^2$

$\cancel{x^3} - \cancel{1} - \cancel{3x^2} + 3x + 2x - 2 + \cancel{1} = \cancel{1} - \cancel{3x^2}$

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

$x^3 + 5x - 3 = 0$

$x^3 = -5x + 3$



یک ریشه دارد

$\boxed{۱۰}$

$f(x) = x - \frac{۴}{x}$

$gof(x) = ax^{۲} + ۲x$

$g(۳) = ۸$

$f(x) = ۳$ $\quad x - \frac{۴}{x} = ۳$ $\quad x^{۲} - ۴ = ۳x$

$x^{۲} - ۳x - ۴ = ۰$

$۹ - ۴(-۴)$

$\frac{۳+۵}{۲} = ۴$ $\quad \frac{۳-۵}{۲} = -۱$

$ax^{۲} + ۲x = ۸$

$x = +۴$ $\quad ۱۶a + ۸ = ۸$ $\quad a = ۰$ ✓

$x = -۱$ $\quad +a - ۲ = ۸$ $\quad \boxed{a = ۱۰}$ ✓

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