نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... کلاس .....

۱

$g(x) = \sqrt{-(x-2)^2} \rightarrow Df = 2$

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

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

$\sqrt{\log_2^{(x-1)}} = 2 \rightarrow \log_2^{x-1} = 4 \rightarrow x-1 = 16 \rightarrow x = 17$

۲

$2(x^2-3x+11-a) = (2x-a)^2 - 3(2x-a) + 1$

$\rightarrow 2x^2-4x+11 = 4x^2-24x+41 \rightarrow 2x^2-20x+30 = 0$

$\alpha^2+\beta^2 = S^2-2P \rightarrow S = \frac{-b}{a} \quad P = \frac{c}{a}$

$\rightarrow 100-30 = \underline{49}$

۳

$g \circ f = ax^2+11 \Rightarrow f(x) = 2x \rightarrow 2x = t \rightarrow \frac{t}{2} = x$

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

$\rightarrow g(x-1) = \frac{a}{4}(x-1)^2 + 11 = \frac{a}{4}x^2 - \frac{3a}{2}x + \frac{29a}{4}$

$x_{min} = \frac{-b}{2a} = 1 \rightarrow y_{min} = 1$

۴

$f(g(x)) = 2(g(x)) - 5 = 2x^2-4x-1$

$2(g(x)) = 2x^2-4x+2 \Rightarrow g(x) = x^2-2x+1$

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

$= 4x^2-20x+30$

۵

$f-g = -x+3 \rightarrow f = 2x+3$

$2g-3f = -15 \quad g = 3x-1$

$f \circ g = f(g(x)) = 2(3x-1)+3 = 6x+1$

$6x+1 = 0 \rightarrow x = -\frac{1}{3}$

۶

$f \circ g \leq g \circ f \rightarrow 9^{\log_3 x} \leq \log_3 9^x$

$\rightarrow x^2 \leq 2x \rightarrow x^2 - 2x \leq 0$

	0		2	
	$+$	$-$		$+$

$\rightarrow x^2 - 2x \leq 0$

$\rightarrow (0, 2]$

۷

$f(x) = x^2 + x$

$f\left(\frac{x^2-2}{x}\right) = (x - \frac{2}{x}) + x^2 + \frac{4}{x^2} - 9$

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

۸

$f \circ g = \log_2^{8x - x^2}$ $\quad 8x - x^2 > 0 \quad (0, 8)$

	0		8	
	$-$	$+$		$-$

$f - g = (-\infty, 4] \rightarrow (0, 2]$

$(0, 8) \cap (0, 2] \rightarrow (0, 2]$

۹

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

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

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

$x^2 + 2x - 2 = 0$ ~~$\times$~~ غیر قابل قبول

۱۰

$g(2) = 1$

$\begin{cases} g(f(x)) = g(2) = 1 \\ f(x) = 2 \end{cases}$

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

$(x+1)(x-2) = 0 \begin{cases} x = -1 \\ x = 2 \end{cases}$

$x = -1 \rightarrow 1 = a(-1)^2 + 2(-1)$

$= -a - 2 = 1 \rightarrow a = -10$

$a(4) + 1 = 1$

$\rightarrow a = 0$