

نام و نام خانوادگی: ..... کلاس: ..... شماره: ..... پاسخنامه تشریحی تکلیف شماره: .....  
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$g(n) = \sqrt{-(n-2)^2} \Rightarrow D_g = \{2\} \Rightarrow f(n) = \sqrt{\log \frac{(n-1)}{2}} = 2$   
 $\Rightarrow \log \frac{n-1}{2} = 4 \Rightarrow n-1 = 17 \Rightarrow D_{g \circ f} = \{17\}$

$f \circ g = 2n^2 - 4n + 11$  و  $g \circ f = 4n^2 - 24n + 41$   
 $\Rightarrow 2n^2 - 4n + 11 = 4n^2 - 24n + 41 \Rightarrow 2n^2 - 20n + 30 = 0$   
 $\alpha + \beta = 10 \quad \alpha\beta = \frac{30}{2} \Rightarrow (\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta = 100$   
 $\Rightarrow \alpha^2 + \beta^2 = 40$   $2\alpha^2 - 20\alpha + 30 = 0$   $\rightarrow 100 - 30 = 70$

$g(n) = 2n^2 + 11 \Rightarrow 2n = t \Rightarrow n = \frac{t}{2} \Rightarrow g(t) = 2 \frac{t^2}{4} + 11$   
 $\Rightarrow g(n) = 2 \frac{n^2}{4} + 11 \Rightarrow g(n-1) = 2 \frac{(n-1)^2}{4} + 11$   
 $= 2 \frac{n^2 - 2n + 1}{4} + 11 = \frac{2}{4} n^2 - \frac{2 \times 2}{4} n + \frac{2 \times 1}{4} + 11$   
 $x_{min} = 1 \Rightarrow y_{min} = 11$

$3g(n) - 4 = 3n^2 - 4n - 1 \Rightarrow 3g(n) = 3n^2 - 4n + 3$   
 $\Rightarrow g(n) = n^2 - 2n + 1 \Rightarrow g(3n-4) = 3(3n-4)^2 - 4(3n-4) + 3$   
 $= 27n^2 - 40n + 19 = g \circ f(n)$   
 $g \circ f(n) = (3n-4)^2 = 9n^2 - 24n + 16$

$g(n) = \frac{3}{4} f(n) - 1 \Rightarrow f(n) = \frac{4}{3} f(n) + 4 = -n + 4$   
 $\Rightarrow -\frac{1}{4} f(n) + 1 = -n + 4 \Rightarrow f(n) = 4n + 4$   
 $f \circ g(n) = \frac{4n}{3} + 4 \Rightarrow 4(g(n)) + 4 = \frac{4n}{3} + 4 \Rightarrow g(n) = \frac{n}{3} + 1$   
 $g \circ g(n) = \frac{3}{4} \times (\frac{n}{3} + 1) - 1 = \frac{3n}{4} - 1 \Rightarrow \frac{3n}{4} - 1 = -\frac{n}{4} - 1$   
 $\Rightarrow a = -\frac{1}{4}$

$$f \circ g(x) = 9^{\log_3 x} = x^{\log_3 9} = x^2, \quad g \circ f(x) = \log_9 x^2 = 2 \log_9 x = 2x$$

$$x^2 \leq 2x \Rightarrow x^2 - 2x \leq 0 \Rightarrow x(x-2) \leq 0$$

$$\frac{0}{+} \frac{2}{-} \frac{1}{+} = \boxed{0 \leq x \leq 2}, \quad x \neq 0 \Rightarrow \boxed{x \in (0, 2]} \quad \text{✓}$$

$$f\left(x - \frac{1}{x}\right) = x^2 + \frac{1}{x^2} - 2 + x - \frac{1}{x}$$

$$= f\left(x - \frac{1}{x}\right) = \left(x - \frac{1}{x}\right)^2 + x - \frac{1}{x}, \quad x - \frac{1}{x} = t$$

$$\Rightarrow f(t) = t^2 + t \Rightarrow \boxed{f(x) = x^2 + x} \quad \text{✓}$$

$$f \circ g(x) = \log_2 (1-x-x^2) \Rightarrow D_{f \circ g} = 1-x-x^2 > 0 \quad \text{1, NO}$$

$$\Rightarrow x(1-x) > 0 \Rightarrow \frac{0}{-} \frac{1}{+} \frac{1}{-} \Rightarrow D_{f \circ g} = (0, 1) = A$$

$$x_{\max} = t \Rightarrow y_{\max} = \log_2 t = t \quad \text{✓}$$

$$\Rightarrow R_{f \circ g} = (-\infty, t] = B \Rightarrow B \cap A = (0, 1] \quad \text{✓}$$

$$f(f(x)) = 1 - 3f(x) \Rightarrow f(x) = t \Rightarrow f(t) = 1 - 3t$$

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

$$\Rightarrow x^3 - 3x^2 + \omega x = 1 - 3x^2 \Rightarrow x^2 + \omega x = 1$$

دو تابع آلیهاً صدقه جمع شه و چون بر دهم R هست ✓ نقطه یک شبه دارد

✓

$$g\left(x - \frac{1}{x}\right) = ax^2 + 2x \Rightarrow x - \frac{1}{x} = 2 \Rightarrow \frac{x^2 - 1}{x} = 2$$

$$\Rightarrow x^2 - 2x - 1 \neq 0 \Rightarrow x = -1, \quad x = 1$$

مثال ۱:  $x = -1 \Rightarrow g(2) = -a - 2 = 1 \Rightarrow a = -1$  ✓

مثال ۲:  $x = 1 \Rightarrow g(2) = a + 2 = 1 \Rightarrow a = -1$  ✓

✓