

۲۰ آزمون عالی نوبتی

$$f(-2) = 3a - 4$$

$$2f(0) = f(-2) + a \Rightarrow f(0) = 2a - 4$$

$$f(0) = 7a + 1$$

$$\Rightarrow 2a - 4 = 7a + 1$$

$$5a = -5$$

$$a = -1 \quad \text{پ}$$

$$f(2-\sqrt{3}) = \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2 \quad \Rightarrow \quad f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2$$

$$f(2-\sqrt{3}) = \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2 \quad \Rightarrow \quad f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2$$

$$f(2-\sqrt{3}) + f(2+\sqrt{3}) = 2(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2)$$

$$\rightarrow 2-\sqrt{3} = a \quad 2+\sqrt{3} = b \quad f(a) + f(b) = \sqrt{a} + \sqrt{b} + \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{b}} + 4 = 2(\frac{\sqrt{a} + \sqrt{b}}{\sqrt{4}}) + 4 = 2\sqrt{4} + 4 = 8$$

$$2f(n) - 3f(-n) = 2n^2 - 9 \quad \times 2 \Rightarrow 4f(n) - 6f(-n) = 4n^2 - 18$$

$$\left[n = -n \right] \Rightarrow -3f(n) + 2f(-n) = 4n^2 - 18 \quad \times 2 \Rightarrow -6f(n) + 4f(-n) = 8n^2 - 36$$

$$\Rightarrow -6f(n) = 2n^2 + 18 \Rightarrow f(n) = -\frac{2n^2 + 18}{6} = -\frac{n^2 + 9}{3} \quad \text{پ}$$

$$(n+2)f(n) - 3f(n+2) = f(n^2 - n + 2) - 3n - 1$$

$$n = 0 \Rightarrow 2f(0) - 3f(2) = f(2) - 3 \Rightarrow f(0) = \frac{3f(2) - 1}{2}$$

$$n = -2 \Rightarrow 4f(0) = 1 \Rightarrow f(0) = \frac{1}{4}$$

$$\Rightarrow \frac{3f(2) - 1}{2} = \frac{1}{4} \Rightarrow 3f(2) - 1 = \frac{1}{2} \Rightarrow 3f(2) = \frac{3}{2} \Rightarrow f(2) = \frac{1}{2}$$

$$f(0) = \frac{3 \times \frac{1}{2} - 1}{2} = \frac{\frac{3}{2} - 1}{2} = \frac{\frac{1}{2}}{2} = \frac{1}{4} \quad \text{پ}$$

$$f(n) = an + b \Rightarrow f(\frac{1}{n}) = \frac{a}{n} + b \Rightarrow f(n) + f(\frac{1}{n}) = \frac{a}{n} + an + 2b$$

$$= \frac{2n^2 - 12n + 3}{n} = 2n + \frac{3}{n} - 12 \Rightarrow a - 3 = -4$$

$$f(-1) = 2(-1) - 4 = -2 - 4 = -6 \quad \text{پ}$$

$$f(u) = (u-1)\sqrt{1-u} \rightarrow D_f = (-\infty, 1] \rightarrow D_f = D_g$$

$$g(u) = -\sqrt{(1-u)^3} \rightarrow D_g = (-\infty, 1]$$

$$g(u) = \sqrt{(1-u)^3} = \pm \sqrt{(1-u)^2(1-u)} = -|1-u|\sqrt{1-u} \xrightarrow{u \leq 1} g(u) = (u-1)\sqrt{1-u}$$

$$\Rightarrow g(u) = f(u) \text{ برابریست.}$$

$$f(u) = u\sqrt{u} \rightarrow D_f = [0, +\infty) \Rightarrow D_f = D_g$$

$$g(u) = \sqrt{u^3} \rightarrow D_g = [0, +\infty)$$

$$g(u) = \sqrt{u^3} = |u|\sqrt{u} \xrightarrow{u \geq 0} g(u) = u\sqrt{u}$$

$$\Rightarrow g(u) = f(u) \text{ برابریست.}$$

$$f(u) = [\sqrt{u} - \lfloor \sqrt{u} \rfloor] \rightarrow 0 \leq \sqrt{u} - \lfloor \sqrt{u} \rfloor < 1 \text{ همواره برابر صفر}$$

$$g(u) = \sqrt{u - \lfloor u \rfloor} \rightarrow D_g = [0, 1] \quad D_f = [0, 1]$$

$$g(u) = 0 \text{ به شرط } u - \lfloor u \rfloor = 0 \text{ همواره صفر}$$

$$\Rightarrow \text{برابریست.}$$

$$f(x) = \{(1, 2), (2, 3), (3, 1), (0, 0)\} \quad g = \{(-1, 1), (1, 1), (2, 3), (3, 0), (0, 2), (1, 2)\}$$

$$\text{الف) } \left(\frac{f(x)}{f(y)}\right)(1) = \frac{2}{2-1} = 2$$

$$\text{ب) } \left(\frac{f(x)}{f(y)}\right)(2) = \frac{3}{0} \text{ کسری نامعین}$$

$$\text{ج) } f(0)g(-1) = 0 \times 1 = 0$$

$$f(u) = \{(2, 1), (-1, 2), (0, \infty), (-2, 2), (3, -1)\}$$

$$\text{الف) } g(u) = f(2 \text{ اینه}) = \{(1, 1), (0, 2), (\frac{1}{3}, \infty), (-\frac{1}{3}, 2), (\frac{4}{3}, -1)\}$$

$$\text{ب) } h(u) = f(f(u)) = \{(2, 1), (-2, 1), (0, \infty), (3, -1), (-3, -1)\}$$

-1, -2
فقط