

۲. آزمون های نوشتاری

$$f(x) = \begin{cases} (n+1)(u+v); & u) \\ u + v; & u) \end{cases} \rightarrow v f(0) = f(v) + a$$

$$u + v; u) \rightarrow f(a+1)(v) = u + v + a \rightarrow 1 + a + v = u + v \rightarrow a = -1$$

$a = -1$

۳. دو تابع در دو نقطه

$$f(u) = \sqrt{u} + \frac{1}{\sqrt{u}} + v, \quad f(v - \sqrt{u}) + f(v + \sqrt{u}) = ?$$

$$f(u) = \frac{u+1}{\sqrt{u}} + v \rightarrow \frac{(v-\sqrt{u})}{\sqrt{v-\sqrt{u}}} + \frac{(v+\sqrt{u})}{\sqrt{v+\sqrt{u}}} = \frac{(v-\sqrt{u})(\sqrt{v+\sqrt{u}}) + (v+\sqrt{u})(\sqrt{v-\sqrt{u}})}{\sqrt{v^2 - u}}$$

$$\sqrt{(v-u\sqrt{u})(v+\sqrt{u})} + \sqrt{(v+u\sqrt{u})(v-\sqrt{u})} + v = \sqrt{u(v-\sqrt{u})(v+\sqrt{u})} + \sqrt{u(v+\sqrt{u})(v-\sqrt{u})}$$

$$v\sqrt{u} + v = v(\sqrt{u} + 1)$$

۴. $v f(u) - u f(-u) = 4u^2 - u \rightarrow f(u) = ?$

$$\begin{cases} (v f(u) - u f(-u) = 4u^2 - u) \times v \rightarrow v f(u) - u f(-u) = 4u^2 v - u v \\ (v f(-u) - u f(u) = 4u^2 + u) \times u \rightarrow u f(-u) - v f(u) = 4u^3 + u^2 \end{cases}$$

$$-v f(u) = 4u^3 + u^2 \rightarrow f(u) = -\frac{4u^3 + u^2}{v}$$

۵. $(u+v) f(u) - u f(u+v) = 4u^2 - u + v u - 1$

$$\begin{aligned} u=0 &\rightarrow v f(0) = v u - 1, \quad u=v \rightarrow u f(0) = u + v u + v u - 1 \\ &\rightarrow u f(0) = 4u - v \end{aligned}$$

$$u f(0) = 10 + 5u \rightarrow 10 + 5u = 4u - v$$

$$f(0) = \frac{v}{4} u - \frac{1}{v} \rightarrow f(0) = \frac{v}{4} \times \frac{9}{v} - \frac{1}{v} \rightarrow f(0) = \frac{25}{4} - \frac{1}{v} = \frac{25}{4}$$

۶. $f(u) + f(\frac{1}{u}) = \frac{u^2 - 14u + 9}{u}, \quad f(-1) = ? \quad f(u) = au + b$

$$au + \frac{a}{u} + vb = \frac{u^2 - 14u + 9}{u} \rightarrow \frac{au^2 + vb u + a}{u} = \frac{u^2 - 14u + 9}{u}$$

$$a = v, \quad b = -4 \rightarrow f(u) = vu - u \rightarrow f(-1) = v(-1) - 4 \rightarrow f(-1) = -9$$

۷. $f(u) = (u-1)\sqrt{1-u}, \quad g(u) = -\sqrt{(1-u)^3}$

$$1-u \geq 0 \rightarrow 1 \geq u$$

۸. $f(u) = u\sqrt{u}, \quad g(u) = \sqrt{u^3}$

$$u \geq 0$$

۹. $Df = Dg$

$$\begin{aligned} u=0 &\rightarrow g(0)=0, \quad f(0)=0 \\ u=1 &\rightarrow f(1)=1\sqrt{1}, \quad g(1)=\sqrt{1^3} \end{aligned}$$

$$f(u) = [\sqrt{u} - \lfloor \sqrt{u} \rfloor] \quad , \quad g(u) = \sqrt{u - |u|}$$

$$u \geq 0$$

$$u - |u| > 0 \rightarrow u > |u| \rightarrow u > 0$$

$$f(u) = [\sqrt{u}] - \lfloor \sqrt{u} \rfloor = 0$$

$$g(u) = \sqrt{u - |u|} \rightarrow R_g = 0$$

$$R_f = 0$$

دستور

$$\{f(1, 2), (2, 3), (3, 1), (0, 0)\} \quad \{g(-1, 1), (1, 1), (2, 3), (3, 5), (5, 7), (7, 9)\}$$

$$\text{الف) } \left(\frac{f+g}{f-g} \right)(1) = \frac{f(1)+g(1)}{f(1)-g(1)} = \frac{1+1}{1-1} = \text{undefined}$$

$$\text{ب) } \left(\frac{f+g}{f-g} \right)(2) = \frac{f(2)+g(2)}{f(2)-g(2)} = \frac{3+3}{3-3} = \text{undefined}$$

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

$$f(u) = \{f(2, 1), (-1, 2), (0, 5), (-2, 3), (3, -1)\}$$

$$\text{الف) } = g(u) = f(3u - 1)$$

$$3u - 1 = 2 \rightarrow u = 1$$

$$3u - 1 = -1 \rightarrow u = 0$$

$$3u - 1 = 3 \rightarrow u = \frac{4}{3}$$

$$3u - 1 = 0 \rightarrow u = \frac{1}{3}$$

$$3u - 1 = -2 \rightarrow u = -\frac{1}{3}$$

$$g(u) = \{f(1, 1), (0, 2), (\frac{4}{3}, 5), (-\frac{1}{3}, 3), (-\frac{1}{3}, -1)\}$$

$$\text{ب) } u(u) = f(|u|) \rightarrow \begin{matrix} |u| = 2 \rightarrow u = \pm 2 \\ |u| = 1 \rightarrow u = \pm 1 \end{matrix} \quad \begin{matrix} |u| = 0 \rightarrow u = 0 \\ |u| = -2 \rightarrow u = \pm 2 \end{matrix}$$

$$g(u) = \{f(2, 1), (-2, 1), (0, 5), (3, -1), (-3, -1)\}$$