

$$Df: \log^{(n-1)}_r > 0 \Rightarrow (n-1) > \frac{1}{r} \Rightarrow n > \frac{1}{r} + 1, n-1 > 0 \Rightarrow n > 1$$

$$Dg: -x^r + rx - r > 0 \xrightarrow{x=1} -1 + r - r < 0 \Rightarrow (n-r)^r < 0 \Rightarrow n=r$$

$$D_{f \circ g}: \{k \in D_f \mid f(n) \in D_g\} \Rightarrow f(n) = r \Rightarrow \log^{(n-1)}_r = r \Rightarrow n=11 \quad D_{f \circ g}: \{11\}$$

$$f \circ g: f(g(n)) = rx^r - 4x + 11, \quad g \circ f: g(f(n)) = rx^r - 24x + 41$$

$$f \circ g: g \circ f \Rightarrow rx^r - 4x + 11 = rx^r - 24x + 41 \Rightarrow rx^r - 20x + 30$$

$$\alpha^r + \beta^r: S^r - 2P = 100 - 2V: 43$$

$$S: +10 \quad P: 11, 11$$

$$f(n): rx \rightarrow f^{-1}: \frac{rx}{r} \quad g \circ f: dx^r + 11 \Rightarrow d\left(\frac{rx}{r}\right) + 11 = \frac{d}{r}x^r + 11$$

$$\frac{d}{r}(n-r)^r + 11 \Rightarrow \frac{d}{r}(x^r - 14x + 49) + 11$$

$$\frac{d}{r}x^r - \frac{14}{r}x + \frac{49}{r} \xrightarrow{\text{min}(S)} x = \frac{b}{a} = \frac{\frac{14}{r}}{\frac{2}{r}} = 7$$

$$g(r-r): \frac{d}{r}1 + 11$$

$$g(0): 11$$

$$f(n): 3n - 4$$

$$f(g(n)): 3n^r - 4n - 1 \Rightarrow 3g(n) - 4: 3n^r - 4n - 1 \Rightarrow g(n): n^r - 2n + 1$$

$$g(f(n)): (3n-4)^r - 2(3n-4) + 1 = 9n^r - 20n + 25$$

$$f \circ g \in \mathbb{Z} \Rightarrow a = -1: y: ak + b: y = -k + d: f(n) - g(n) = -k + d$$

$$3n + 4 - g(n) = -k + d \Rightarrow g(n) = 3n - 1$$

$$f \circ g: f(g(n)): 3(3n-1) + 4 = 9n + 2$$

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

$$\hookrightarrow 1, d f(n) - g(n) = 14$$

$$1, d f(n) - f(n) = -k + d = 14$$

$$-f(n) - k + d$$

$$9n + 2 = 0 \Rightarrow 9n = -2$$

$$n = -\frac{2}{9} = -\frac{1}{4.5} = -0.22$$

$$f(n): 3n + 4 \leftarrow 0, d f(n): n + 1$$

$$g(u): \log_u^2, f(u): u^2 \Rightarrow f \circ g: u^{\log_u^2} = u^{\log_u^1} = \underline{u^2}$$

$$g \circ f: \log_{u^2}^1 = u \log_u^1: 2u$$

$$\xrightarrow{\text{بازرسی معادله}} u^2 \leq 2u \Rightarrow u^2 - 2u \leq 0 \rightarrow u(u-2) \leq 0$$

$$\boxed{2, 1} \leftarrow \text{تعداد اعضاء برابر با ۲: ۱ و ۲} \quad \begin{array}{c} u > 0 \\ \uparrow \quad \uparrow \\ 0 < u \leq 2 \end{array} \quad \begin{array}{c} \text{احمال شرط نگذیریم} \\ + \quad - \quad + \end{array}$$

$$\xrightarrow{\text{مدرج کردن}} f(u - \frac{1}{u}) = (u^2 + \frac{4}{u^2}) + (u - \frac{1}{u}) - 4$$

$$\xrightarrow{t: u - \frac{1}{u}} +^2: (u - \frac{1}{u})^2 = u^2 - 4 + \frac{4}{u^2} \Rightarrow t^2 + 4: (u^2 + \frac{4}{u^2})$$

$$\rightarrow f(t): (t^2 + 4) + t - 4: t^2 + t \Rightarrow \boxed{f(u): u^2 + u}$$

$$f(u): \log_u^2, g(u): 1u - u^2 \Rightarrow f \circ g: \log_{1u - u^2}^2$$

$$\Rightarrow A: D_f: 1u - u^2 > 0 \Rightarrow u(1-u) > 0 \Rightarrow \frac{0}{-1} \wedge \frac{1}{1-} \Rightarrow (0, 1)$$

$$\Rightarrow B: R_f \xrightarrow[\text{از } y \text{ استفاده می کنیم}]{y \text{ در } x} u^2: -\frac{b}{2a}: \frac{-1}{-2}: \frac{1}{2} \Rightarrow a > 0 \xrightarrow{\max} 1 - 1/4: 1/4 \Rightarrow \log_y^{1/4}: 4$$

$$\hookrightarrow R_f: (-\infty, 4] \quad (0, 1) \cap (-\infty, 4] = (0, 4] = \boxed{\text{۴ عضو دارد}}$$

$$g(u): u-1, h(u): u^3 + 2u + 1 \Rightarrow h(g(u)): (u-1)^3 + 2(u-1) + 1$$

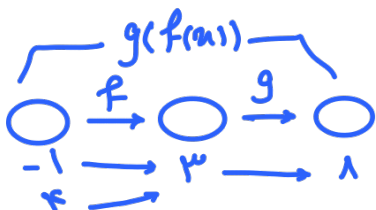
$$f \circ f: 1 - 3f^2(u): f(f(u)): 1 - 3(f(u))^2 \Rightarrow h(g(u)): u^3 - 3u^2 + 5u - 2$$

$$\hookrightarrow f(u): \underline{1 - 3u^2} \quad u^3 - 3u^2 + 5u - 2 = 1 - 3u^2$$

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

$$\boxed{1 \text{ ریشه دارد}}$$

تعریف ریانی
تابع مرکب:



$$u - \frac{4}{u} = 3 \Rightarrow u^2 - 3u - 4 = 0 \rightarrow \begin{array}{c} -1 \\ 4 \end{array}$$

$$-1 \Rightarrow g(f(-1)): -a - 2: 3$$

$$4 \Rightarrow g(f(4)): 4a + 1: 3$$

$$-a = 5 \rightarrow \boxed{a: -5}$$

$$4a = -5 \quad \boxed{a: \frac{-5}{4}}$$

امیرعلی جهانپناه تشدر از لطف شما