

پیرا ۱

$$f\left(\frac{x}{y}\right)$$

-۱

$$\cot \frac{x}{y} = \frac{x}{y} \rightarrow \frac{xy}{y^2} = \frac{x}{y}$$

$$\cot \frac{x}{y} = \frac{\frac{\sqrt{x}}{y}}{\frac{1}{y}} = \frac{\sqrt{x}}{1} = \sqrt{x}$$

$$f(\sqrt{x}) \rightarrow \sqrt{x+1} = \sqrt{x} = x$$

$$f\left(g\left(\frac{x}{y}\right)\right)$$

۲- الف)

$$g(x) = x \cos^2 x \quad g\left(\frac{x}{y}\right) = x \cos^2 \frac{x}{y} \approx \frac{1}{y}$$

$$f\left(\frac{1}{y}\right) = \sqrt{1 - \frac{1}{y}} = \sqrt{\frac{y-1}{y}} = \frac{\sqrt{y-1}}{\sqrt{y}}$$

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

$$f(x) = [x]$$

$$f(g(\sqrt{x}))$$

۳- ب)

$$g(x) = \frac{x}{1-x} \rightarrow g(\sqrt{x}) = \frac{\sqrt{x}}{1-\sqrt{x}} \xrightarrow{\text{کذا}} \frac{\sqrt{x}+2}{1-2} = -(\sqrt{x}+2) = -\sqrt{x}-2$$

$$f(-\sqrt{x}-2) = [-\sqrt{x}-2] = -x$$

$$g\left(f\left(\frac{x}{y}\right)\right)$$

۴- ج)

$$f\left(\frac{x}{y}\right) = \sin \frac{x}{y} = \frac{\sqrt{x}}{y}$$

$$g\left(\frac{\sqrt{x}}{y}\right) = \frac{\sqrt{x}}{y} \times \sqrt{1 - \frac{x}{y}} \rightarrow \frac{\sqrt{x}}{y} \times \frac{1}{\sqrt{y}} = \frac{1}{y}$$

پیرا احسنی

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(الف)

$$\epsilon \rightarrow \gamma \rightarrow \omega$$

$$\gamma \rightarrow \gamma \rightarrow \omega$$

$$\gamma \rightarrow \wedge \rightarrow 12$$

$$\wedge \rightarrow 10 \rightarrow 12$$

$$\left. \begin{array}{l} \gamma \rightarrow \wedge \rightarrow 12 \\ \wedge \rightarrow 10 \rightarrow 12 \end{array} \right\} f(g(m)) = \{(\epsilon, \omega), (\gamma, \omega), (\gamma, 12), (\wedge, 12)\}$$

(ب)

$$\epsilon \rightarrow \omega \rightarrow \emptyset$$

$$\gamma \rightarrow \omega \rightarrow \emptyset$$

$$\wedge \rightarrow 12 \rightarrow \emptyset$$

$$10 \rightarrow 12 \rightarrow \emptyset$$

$$\left. \begin{array}{l} \epsilon \rightarrow \omega \rightarrow \emptyset \\ \gamma \rightarrow \omega \rightarrow \emptyset \end{array} \right\} g(f(m)) = \emptyset$$

(ج)

$$\epsilon \rightarrow \omega \rightarrow \emptyset$$

$$\gamma \rightarrow \omega \rightarrow \emptyset$$

$$\wedge \rightarrow 12 \rightarrow \emptyset$$

$$10 \rightarrow 12 \rightarrow \emptyset$$

$$\left. \begin{array}{l} \epsilon \rightarrow \omega \rightarrow \emptyset \\ \gamma \rightarrow \omega \rightarrow \emptyset \end{array} \right\} f(f(m)) = \emptyset$$

(د)

$$\epsilon \rightarrow \gamma \rightarrow \wedge$$

$$\gamma \rightarrow \gamma \rightarrow \gamma$$

$$\gamma \rightarrow \wedge \rightarrow 10$$

$$\wedge \rightarrow 10 \rightarrow \emptyset$$

$$\left. \begin{array}{l} \epsilon \rightarrow \gamma \rightarrow \wedge \\ \gamma \rightarrow \gamma \rightarrow \gamma \end{array} \right\} g(g(m)) = \{(\epsilon, \wedge), (\gamma, \gamma), (\gamma, 10)\}$$

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$$f(g(m)) \Rightarrow \epsilon \xrightarrow{g} m \xrightarrow{f} \gamma \Rightarrow m = \gamma \Rightarrow a = \gamma$$

$$g(f(m)) \Rightarrow \epsilon \xrightarrow{f} z \xrightarrow{g} 1 \Rightarrow z = b \Rightarrow b = \omega$$

$$(a, b) = (\epsilon, \omega)$$

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$$f(m) = am + b \rightarrow f(f(m)) = \epsilon m + \gamma \rightarrow f(f(m)) = f(am + b) =$$

$$a(am + b) + b = a^2m + ab + b$$

$$a^2 = \gamma, a = \gamma \gamma, ab + b = \gamma \rightarrow b(a + 1) = \gamma$$

$$\xrightarrow{a = \gamma} -b = \gamma, b = -\gamma$$

$$\xrightarrow{a = \gamma} \gamma b = \gamma \rightarrow b = 1$$

$$g(\gamma m + \gamma) = \gamma m - \gamma + m \rightarrow g(t) = t - \omega + \frac{t - \gamma}{\gamma} = \frac{\gamma t - 1\gamma}{\gamma}$$

GOLBARG

پریا امینی

۹ - ادانه

$$\left. \begin{aligned} f(-1) \frac{f(x) = x+1}{x} &= -1 \\ f(-1) \frac{f(x) = -x-3}{x} &= -1 \end{aligned} \right\} \text{مشترک}$$

$$g(-1) = \frac{-3-1}{-1} = \frac{-4}{-1} = 4$$

✓

$$D_f \Rightarrow x+|x| > 0 \rightarrow x \geq 0$$

$$D_g \Rightarrow x^2 - \{x \geq 0 \rightarrow x(x-\varepsilon) = 0 \mid x \geq 0, x \neq \varepsilon\} \mathbb{R} - \{0, \varepsilon\}$$

$$D_{g \circ f} = \{x \in D_f \mid f(x) \in D_g\} \rightarrow D_{g \circ f} = \{x \mid x \neq 0, x \neq \varepsilon, f(x) \geq 0\}$$

$$D_{g \circ f} = D_f = \mathbb{R} - \{0, \varepsilon\} \rightarrow (-\infty, 0) \cup (0, \varepsilon) \cup (\varepsilon, +\infty)$$

△

$$f(x) \rightarrow 1-x^2 \geq 0 \rightarrow 1 \geq x^2 \rightarrow -1 \leq x \leq 1$$

$$g(x) \rightarrow x \geq 0$$

$$D_{f+g} \rightarrow D_f \cap D_g \rightarrow D_{f+g} = [-1, 1] \rightarrow f(x) \in [-1, 1]$$

$$0 \leq f(x) \leq 1 \rightarrow 0 \leq \sqrt{1-x^2} \leq 1$$

$$0 \leq \sqrt{1-x^2} \text{ صحیح}$$

$$\sqrt{1-x^2} \leq 1 \rightarrow 1-x^2 \leq 1 \rightarrow -x^2 \leq 0 \rightarrow x^2 \geq 0 \text{ صحیح}$$

$$D_{(f+g) \circ f} \rightarrow [-1, 1] \cap [-1, 1] \rightarrow D = [-1, 1]$$

پیرا ایسی

(۹-اف)

$$f\left(\frac{r_n+1}{n-r}\right) = \varepsilon n + \omega$$

$$t = \frac{r_n+1}{n-r} \xrightarrow{n \neq r} t n - r t = r_n + 1 \rightarrow t n - r n = 1 + r t \rightarrow$$

$$n(t-r) = 1 + r t \rightarrow n = \frac{r t + 1}{t-r}$$

$$f(t) = r\left(\frac{r t + 1}{t-r}\right) + \omega \rightarrow f(t) = \frac{r(r t + 1)}{t-r} + \frac{\omega(t-r)}{t-r} \rightarrow$$

$$f(t) = \frac{\varepsilon + r t + \omega t - \omega}{t-r} \rightarrow f(t) = \frac{r t - 1}{t-r} \rightarrow f(n) = \frac{r n - 1}{n-r}$$

ب.

$$n + \frac{1}{n} = t$$

$$\left(n + \frac{1}{n}\right)^r = n^r + r n^{r-1} \times \frac{1}{n} + r \frac{r-1}{2} n^{r-2} \times n + \frac{1}{n^r} \rightarrow$$

$$n^r + \frac{1}{n^r} + r n + \frac{r(r-1)}{2} = \left(n + \frac{1}{n}\right)^r \rightarrow n^r + \frac{1}{n^r} =$$

$$\left(n + \frac{1}{n}\right)^r - r\left(n + \frac{1}{n}\right) \rightarrow f(t) = t^r - r t \rightarrow f(n) = n^r - r n$$

$$g(f(n)) = g(n\sqrt{n}) = 0$$

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$$g(2\sqrt{2}) = 0$$

$$g(1) = 0$$

$$n\sqrt{n} = 2\sqrt{2} \rightarrow n = 2$$

$$n\sqrt{n} = 1 \rightarrow n = 1$$

$$\left. \begin{array}{l} n = 2 \\ n = 1 \end{array} \right\} |r-1| = 1$$