

۱۹۱۵ آفرین

$$f(x) = \begin{cases} a + (x+1)^2 & ; x > 1 \\ 3a + 2x & ; x \leq 1 \end{cases}$$

$$f(-1) = 3a - 2$$

$$\rightarrow f_a - f = 14a + 14 = -18 = 10a \Rightarrow a = -9$$

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

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$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2$$

$$f(x-\sqrt{x}) + f(x+\sqrt{x}) \xrightarrow{\frac{(x+\sqrt{x})^2}{x}} \sqrt{x} + 2 + \sqrt{x} + 2 = 2\sqrt{x} + 4$$

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$$f(x) - f(-x) = 2x^2 - x$$

$$f(-x) - 3f(x) = 2x^2 + x$$

$$-4f(x) = 20x^2 + x \rightarrow f(x) = -5x^2 - \frac{x}{4}$$

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$$(x+1)f(x) - 3xf(x+1) = 2x^2 - mx + m - 1 \rightarrow 2x^2 - mx + m - 1 = 2x^2 - 2mx + m - 1$$

$$(2x^2 - mx + m - 1) - (2x^2 - 2mx + m - 1) = 0 \rightarrow -mx + m - 1 = -2mx + m - 1$$

$$(0+1)f(0) - 3f(0+1) = m - 1$$

$$f(0) = -1 \rightarrow -3f(1) = 2(-1)^2 - m(-1) + m - 1 = m - 1$$

$$2f(0) = m - 1 \rightarrow f(0) = \frac{m-1}{2} \xrightarrow{m=9} f(0) = 4$$

$$f(0) = 1 + m - 1 = m$$

$$m(2m-1) = 10 + 9m \rightarrow m = 9$$

$$f(x)f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} \rightarrow 2x - 1 + \frac{2}{x} = f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b$$

$$f(-1) = -9$$

$$\rightarrow f(x) = 2x - 1$$

$$f(-1) = -9$$

$$f(x) = (x-1)\sqrt{1-x}$$

$$g(x) = \sqrt{1-x}$$

$$\rightarrow -\sqrt{1-x}^x \sqrt{1-x} \rightarrow -\sqrt{1-x}^{x+1}$$

$f(x) = x\sqrt{x} \rightarrow x \geq 0 \rightarrow \sqrt{x^3}$
 $g(x) = \sqrt{x^4} \rightarrow x \geq 0$

$$[\sqrt{n} - \lfloor \sqrt{n} \rfloor] = \lfloor \sqrt{n} \rfloor - \lfloor \sqrt{n} \rfloor = 0$$

$f(x) = [\sqrt{x} - [\sqrt{x}]] \quad \text{هر دو تا بزرگتر از صفر هستند!} \quad \rightarrow \quad x=2 \rightarrow f(x) = [\sqrt{2} - 1]$
 $g(x) = |\sqrt{x} - [\sqrt{x}]| \quad [1.4 - 1] = 0.4$
 $x - [x] > 0 \rightarrow x > 0 \rightarrow x - [x] = 0 \quad \xrightarrow{x=2} g(x) = 0$
 $x < 0 \rightarrow x - [x] \rightarrow 2x < 0 \quad x$

$$\left(\frac{f+g}{f-g} \right) \xrightarrow{f(1)=1, g(1)=1} \frac{1+1}{1-1} = \infty$$

$$\frac{1}{f-g} \cdot \frac{f(r)=v}{g(r)=v} \quad \frac{v}{0} \quad X$$

$$f(0) \cdot g(1) = 1 \times 0 = 0$$

$$\begin{aligned}
 &g(x) = f(\phi(x)) \rightarrow \phi(x-1) = x \rightarrow x-1 \rightarrow g_1 = f(\phi) = 1 \quad / \quad \phi(x-1) = 0 \rightarrow x = \frac{1}{\phi} \\
 &\phi(x-1) = -1 \rightarrow x = 0 \rightarrow g(\phi) = f(-1) = \epsilon \quad / \quad \phi(\frac{1}{\phi}) = f(\phi) = \phi \\
 &g = \{(1,1), (0, \epsilon), (\frac{1}{\phi}, \phi), (-\frac{1}{\phi}, \psi), (\epsilon, \phi, -1)\} \\
 &h(x) = f(\psi(x)) \rightarrow |\psi(x)| = \psi \rightarrow x \pm \psi \quad : h(\psi) = h(-\psi) = f(\psi) = 1 \\
 &|\psi| = 0 \rightarrow h(\phi) = f(\phi) = \phi \\
 &|\psi| = \psi \rightarrow h(\psi) = f(\psi) = -1 \\
 &h = \{(\psi, 1), (-\psi, 1), (0, \phi), (\psi, -1), (-\psi, -1)\}
 \end{aligned}$$

$$f(n) = [\sqrt{n} - [\sqrt{n}]] \rightarrow \sqrt{n} \rightarrow n \geq 0 \rightarrow D_f = [0 + \infty)$$

$$g(n) = \sqrt{n-1} \rightarrow n-1 \geq 0 \rightarrow D_g = [0 + \infty)$$

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$$f(n) = [\sqrt{n}] - [\sqrt{n}] = 0 \quad \text{عدد صحیح از برکت می آید بیرون}$$

$$g(n) = 0 \quad \text{نات برابرند!} \rightarrow n-1 = n \neq 0 \rightarrow \text{نسبت صفر است!}$$