

$$2f(a) = f(-2) + a$$

$$\Rightarrow \forall x \forall a (a+1) = f_a - f \Rightarrow 1(a+1) = f_a - f \Rightarrow 1(a+1) = f_a - f \Rightarrow a = -\frac{1}{2}$$

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

$$(2-\sqrt{3})(2+\sqrt{3}) = 1 = \text{در عبارت معکوس اینی و مقادیر 4 را به جای 1 می‌نویسیم} \Rightarrow f(2-\sqrt{3}) = f(2+\sqrt{3})$$

$$\left. \begin{aligned} f(2+\sqrt{3}) &= \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + 2 \\ &= \frac{\sqrt{4+1}}{\sqrt{2}} + \frac{\sqrt{4-1}}{\sqrt{2}} = \frac{2\sqrt{3}}{\sqrt{2}} = \sqrt{6} + 2 \end{aligned} \right\}$$

$$2(\sqrt{6}+2) = 4 + 2\sqrt{6}$$

$$2f(x) - 3f(-x) = 4x^2 - x$$

$$(2f(-x) - 3f(x)) = 4x^2 + x \times \frac{1}{x}$$

$$\Rightarrow f(x) = -4x^2 + \frac{1}{4}x$$

$$\left. \begin{aligned} 2f(x) - 3f(-x) &= 4x^2 - x \\ -4f(x) + 3f(-x) &= 4x^2 + x \end{aligned} \right\} \text{ع.} \Rightarrow -2/5 f(x) = 10x^2 + \frac{1}{5}x$$

$$\begin{aligned} x=2 &\rightarrow 2f(0) = 12 + 2m + 3m - 1 \\ x=0 &\rightarrow (2f(0) = 3m - 1) \times 2 \end{aligned}$$

$$\left. \begin{aligned} 4m - 2 &= 6m + 1 \Rightarrow m = -3/2 \Rightarrow 2f(0) = 3m - 1 \\ &\Rightarrow f(0) = \frac{3m-1}{2} = \frac{12/2 - 1}{2} = 5/2 \end{aligned} \right\}$$

$$f(x) + f\left(\frac{1}{x}\right) = -3x + \frac{1}{x} - 12$$

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

$$\left. \begin{aligned} \frac{a}{x} + ax + b &= -3x + \frac{1}{x} - 12 \Rightarrow a = -3, b = -12 \\ \Rightarrow f(x) &= -3x - 12 \Rightarrow f(-1) = 3 - 12 = -9 \end{aligned} \right\}$$

$$\begin{aligned} f(x) &= (x-1)\sqrt{1-x} \\ g(x) &= -\sqrt{(1-x)^3} \end{aligned}$$

$$\begin{aligned} D_f &= (-\infty, 1] \\ D_g &= (-\infty, 1] \end{aligned}$$

$$\xrightarrow{\text{در } x=0}$$

$$\begin{aligned} f(0) &= -1 \times \sqrt{1} = -1 \\ g(0) &= -\sqrt{(1-0)^3} = -\sqrt{1} = -1 \end{aligned}$$

→ دو تابع برابرند

$$\begin{aligned} f(x) &= x\sqrt{x} \\ g(x) &= \sqrt{x^3} \end{aligned}$$

$$\begin{aligned} D_f &= \mathbb{R}^+ \\ D_g &= \mathbb{R}^+ \end{aligned}$$

$$\xrightarrow{\text{در } x=3}$$

$$\begin{aligned} f(3) &= 3\sqrt{3} = \sqrt{27} \\ g(3) &= \sqrt{27} \end{aligned}$$

$$\begin{aligned} f(x) &= [\sqrt{x} - \sqrt{x}] \\ g(x) &= \sqrt{x^2 - 1} \end{aligned}$$

$$\begin{aligned} D_f &= \mathbb{R}^+ \\ D_g &= \mathbb{R}^+ \end{aligned}$$

$$\xrightarrow{\text{در } x=2}$$

$$\begin{aligned} f(2) &= [\sqrt{2} - \sqrt{2}] = 0 \\ g(2) &= \sqrt{2^2 - 1} = 0 \end{aligned}$$

$$\left(\frac{f+g}{f-g}\right)(1) = \frac{1+2}{2-1} = 3$$

$$\left(\frac{f+g}{f-g}\right)(2) = \frac{3+3}{3-3} = \frac{6}{0} \text{ تعریف نشده}$$

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

$$\text{الف. } f(3x-1) = \left\{ (1,1), (0,4), \left(\frac{1}{3}, \infty\right), \left(-\frac{1}{3}, 2\right), \left(\frac{4}{3}, -1\right) \right\}$$

$$\text{ب. } f(1/x) \Rightarrow \left\{ (2,1), (-2,1), (0,\infty), (3,-1), (-3,-1) \right\}$$