

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

$$\downarrow$$

$$\underbrace{2(a+1) \times 7}_{14a+14} = \underbrace{3a-2+a}_{4a-2} \rightarrow 10a = -14 \rightarrow a = -\frac{14}{10} = -\frac{7}{5}$$

$$f(2-\sqrt{3}) = \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2 \rightarrow f(2-\sqrt{3}) = \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2$$

$$f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2 \rightarrow f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + 2$$

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

پاسخ: $\left. \begin{matrix} a=2-\sqrt{3} \\ b=2+\sqrt{3} \end{matrix} \right\} \rightarrow f(a)+f(b) = \sqrt{a}+\sqrt{b} + \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{b}} + 2 = 2(\sqrt{a}+\sqrt{b}) + 2 = 2(\sqrt{4}+\sqrt{4}) + 2 = 10$

$$(2f(x) - 3f(-x) = 12x^2 - x) \times 2 \rightarrow 2f(x) - 6f(-x) = 24x^2 - 2x$$

if $x = -x \rightarrow (-3f(x) + 2f(-x) = 12x^2 + x) \times 3 \rightarrow -9f(x) + 6f(-x) = 36x^2 + 3x$

$$-5f(x) = 20x^2 + x \rightarrow f(x) = -\frac{1}{5}(20x^2 + x)$$

$$(n+2)f(n) - 3nf(n+2) = 12n^2 - nx + 3n - 1$$

$$\text{if } n=0 \rightarrow 2f(0) = 3n-1 \rightarrow f(0) = \frac{3n-1}{2}$$

$$\text{if } n=-2 \rightarrow 4f(0) = 15+5n \rightarrow f(0) = \frac{15+5n}{4}$$

$$\frac{3n-1}{2} = \frac{15+5n}{4} \rightarrow 10n+10 = 12n-4 \rightarrow 12n=14 \rightarrow n=\frac{7}{6}$$

$$f(0) = \frac{3(\frac{7}{6})-1}{2} = \frac{\frac{7}{2}-1}{2} = \frac{\frac{5}{2}}{2} = \frac{5}{4}$$

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

$$\frac{3x^2-12x+3}{x}$$

$x=-1 \rightarrow 2f(-1) = \frac{3+12+3}{-1} \rightarrow f(-1) = -9$

$$\left\{ \begin{array}{l} f(x) = (x-1)\sqrt{1-x} \rightarrow Df = (-\infty, 1] \\ g(x) = -\sqrt{(1-x)^3} \rightarrow Dg = (-\infty, 1] \end{array} \right\} \rightarrow Df = Dg$$

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$$-\sqrt{(1-x)^3} = -\sqrt{(1-x)^2(1-x)} = -|1-x|\sqrt{1-x} \xrightarrow{x \leq 1} (x-1)\sqrt{1-x} \Rightarrow g(x)$$

$$\left\{ \begin{array}{l} f(x) = x\sqrt{x} \rightarrow Df = [0, +\infty) \\ g(x) = \sqrt{x^3} \rightarrow Dg = [0, +\infty) \end{array} \right\} \rightarrow Df = Dg$$

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$$\downarrow$$

$$= |x|\sqrt{x} \xrightarrow{x \geq 0} g(x) = x\sqrt{x} \rightarrow Dg = [0, +\infty)$$

$$\left\{ \begin{array}{l} f(x) = [\sqrt{x} - [\sqrt{x}]] \rightarrow 0 \leq \sqrt{x} - [\sqrt{x}] < 1 \rightarrow f(x) = 0 \\ g(x) = \sqrt{x - |x|} \rightarrow Dg = [0, +\infty) \end{array} \right\} \rightarrow Df = Dg$$

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$$x - |x| \geq 0 \rightarrow x \geq |x| \rightarrow x \geq 0$$

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

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

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

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

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

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

$$\rightarrow x_{n-1} = y \rightarrow x = \frac{y+1}{2} \rightarrow f(x) = f\left(\frac{y+1}{2}\right)$$

$$a) g(x) = f(x_{n-1}) = \left\{ \left(\frac{1}{2}, 1\right), \left(\frac{0}{2}, 2\right), \left(\frac{1}{2}, 5\right), \left(-\frac{1}{2}, 2\right), \left(\frac{2}{2}, -1\right) \right\}$$

$$b) h(x) = f(|x|) = \{(2,1), (0,5), (3,-1)\}$$

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$$\downarrow$$

$$-1, -2$$

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