

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

↓

$$2(a+1) \times 7 = \frac{3a-2+a}{2a-2} \rightarrow 10a = -11 \rightarrow a = -\frac{11}{10} = -\frac{9}{10}$$

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

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

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

$$\text{جواب: } \begin{cases} a = 2-\sqrt{3} \\ b = 2+\sqrt{3} \end{cases} \rightarrow f(a)+f(b) = \sqrt{a}+\sqrt{b} + \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{b}} + 2 = 2(\sqrt{a}+\sqrt{b}) + 2 = 2(\sqrt{4}+2) = 2(2+2) = 8$$

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

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

$$-8f(x) = 20x^2 + x \rightarrow f(x) = -\frac{5}{4}x^2 - \frac{x}{8}$$

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

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

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

$$\frac{3n-1}{2} = \frac{15+5m}{4} \rightarrow 10m+6 = 12n-4 \rightarrow 12m = 34 \rightarrow m = \frac{17}{6}$$

$$f(0) = \frac{3(\frac{17}{6})-1}{2} = \frac{\frac{17}{2}-1}{2} = \frac{\frac{15}{2}}{2} = \frac{15}{4}$$

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

$$x=-1 \rightarrow 2f(-1) = \frac{3+17+3}{-1} \rightarrow f(-1) = -9$$

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

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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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$$\downarrow$$

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

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

$Df = [0, +\infty)$

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

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$Df = Dg$

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

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

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

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

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

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

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

$$a) g(x) = f(x_{n-1}) = \left\{ \left(\frac{1}{2}, 1\right), \left(\frac{0}{2}, 2\right), \left(\frac{1}{3}, \infty\right), \left(-\frac{1}{3}, 2\right), \left(\frac{2}{3}, -1\right) \right\}$$

$$\rightarrow h(x) = f(|x|) = \{(2,1), (0,\infty), (\pm 3, -1)\} =$$

$$\downarrow$$

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