

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

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$$2f(5) = f(-2) + a \rightarrow \frac{2(a+1)(7)}{14a+14} = 3a-4+a \rightarrow 10a = -18 \rightarrow a = -1,8$$

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

$$A^2 = 2 + \sqrt{3} + 2 - \sqrt{3} + 2\sqrt{3-3} \rightarrow A = \pm\sqrt{6}$$

$$f(2+\sqrt{3}) + f(2-\sqrt{3}) = (\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}) + \frac{1}{\sqrt{2+\sqrt{3}}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 4 = 2A + 4 = 2\sqrt{6} + 4$$

مخرج مشترک
 $\sqrt{4-3} = 1$

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$$\begin{aligned} x \rightarrow 2f(x) - 3f(-x) &= 4x^2 - x \rightarrow -4f(-x) + 4f(x) = 8x^2 - 2x \\ -x \rightarrow 2f(-x) - 3f(x) &= 4x^2 + x \rightarrow 4f(-x) - 9f(x) = 12x^2 + 3x \end{aligned}$$

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$$-5f(x) = 20x^2 + x$$

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

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

$$x=-2 \rightarrow 4f(0) = 14+5m-1$$

$$\Rightarrow 4f(0) = 14+2m = 5m-2$$

$$18 = 3m \rightarrow m = 6$$

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$$f(0) = \frac{14+2m}{4} = \frac{14+9}{4} = 9,25$$

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

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$$\left\{ \begin{array}{l} f(x) = (x-1)\sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow D_f = (-\infty, 1] \\ g(x) = -\sqrt{(1-x)^3} \rightarrow (1-x)^3 \geq 0 \rightarrow D_g = (-\infty, 1] \end{array} \right\} \Rightarrow f(x) = g(x)$$

$$g(x) = -\sqrt[3]{1-x} \sqrt{1-x} = (x-1)\sqrt{1-x} = f(x)$$

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

$$g(x) = \sqrt{x^3} = \sqrt{x^2 \cdot x} = |x|\sqrt{x} \xrightarrow{x \geq 0} x\sqrt{x}$$

$$\left\{ \begin{array}{l} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] \rightarrow D_f = [0, +\infty) \\ g(x) = \sqrt{x - |x|} \end{array} \right\} \rightarrow D_g = [0, +\infty)$$

$x > 0 \rightarrow g(x) = \sqrt{x - x} = 0$
 $x = 0 \rightarrow g(x) = 0$
 $x < 0 \rightarrow g(x) = \sqrt{x + x} = \sqrt{2x}$ (غ. ق. خ)

$$f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] = [\sqrt{x}] - \lfloor \sqrt{x} \rfloor = 0$$

$f(x) = g(x)$

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

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

ج) $f(0)g(-1) = 0 \times 1 = 0$

$$f(x) = \{(2, 1), (-1, 4), (0, 5), (-2, 2), (3, -1)\}$$

الف) $f(3x-1) = g(x) = \{(1, 1), (0, 4), (\frac{1}{3}, 5), (-\frac{1}{3}, 2), (-\frac{4}{3}, -1)\}$

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