

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

$$1f(a) = f(-1) + a$$

-1

$$f(a) = (a+1)(1) \Rightarrow 1a + 1 \quad , \quad f(-1) = 1a - 1$$

$$1(1a + 1) = 1a - 1 + a \Rightarrow 1a + 1 = a - 1 \Rightarrow 1a = -2 \Rightarrow \boxed{a = \frac{-2}{1}}$$

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

$$\underbrace{f(1-\sqrt{3})}_{x_1} + \underbrace{f(1+\sqrt{3})}_{x_2} = 1\sqrt{4} + 1$$

-2

$$x_1 \times x_2 = (1-\sqrt{3})(1+\sqrt{3}) = 1 - 3 = -2 \quad x_1 = \frac{1}{x_2} \quad , \quad x_2 = \frac{1}{x_1}$$

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 1 \Rightarrow f(x_1) = \sqrt{x_1} + \frac{1}{\sqrt{x_1}} + 1 \quad , \quad f(x_2) = \sqrt{x_2} + \frac{1}{\sqrt{x_2}} + 1$$

$$f(x_1) + f(x_2) = \underbrace{\sqrt{x_1} + \sqrt{x_2}}_{\sqrt{4}} + \underbrace{\frac{1}{\sqrt{x_1}} + \frac{1}{\sqrt{x_2}}}_{\sqrt{4}} + 1 = \boxed{1\sqrt{4} + 1}$$

$$(\sqrt{x_1} + \sqrt{x_2})^2 = x_1 + x_2 + 1 \underbrace{\sqrt{x_1 x_2}}_1 = (1-\sqrt{3}) + (1+\sqrt{3}) + 1 = 3$$

$$\Rightarrow \sqrt{x_1} + \sqrt{x_2} = \sqrt{3}$$

مسئله ۲

$$f'(x) - f'(-x) = \varepsilon x^r - x$$

$x \rightarrow -x$

$$f'(-x) - f'(x) = \varepsilon(-x)^r + x$$

$\downarrow$

$$\left. \begin{array}{l} f'(-x) - f'(x) = \varepsilon x^r + x \\ f'(x) - f'(-x) = \varepsilon x^r - x \end{array} \right\} \begin{array}{l} -9f(x) + 9f(-x) = 14x^r + 7x \\ \varepsilon f(x) - 9f(-x) = 1x^r - 7x \end{array} \right\} - \Delta f(x) = 70x^r + x$$

$$f(x) = \frac{70x^r + x}{-10} \Rightarrow f(x) = -\varepsilon x^r - \frac{1}{10}x$$

$$(x+r)f(x) - rf(x+r) = \varepsilon x^p - mx + r_{m-1}$$

$$f(0) =$$

✖

$$\xrightarrow{x=0} rf(0) - 0f(r) = r_{m-1} \rightarrow rf(0) = r_{m-1}$$

$$\Rightarrow \boxed{f(0) = \frac{r_{m-1}}{r}}$$

$$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^2 - 12x + 3}{x} \quad f(-1) = \quad , f(x) = ax + b \quad -\Delta$$

$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = \frac{ax^2 + 2bx + a}{x} = \frac{3x^2 - 12x + 3}{x}$$

$$a = 3, b = -4 \Rightarrow f(x) = 3x - 4 \quad f(-1) = -3 - 4 = \boxed{-7}$$

$$\begin{cases} f(x) = (x-1)\sqrt{1-x} & D_f = 1-x \geq 0 \Rightarrow x \leq 1 \xrightarrow{x=0} -1 \\ g(x) = -\sqrt{(1-x)^3} & D_g = (1-x)^3 \geq 0 \Rightarrow 1-x \geq 0 \Rightarrow x \leq 1 \xrightarrow{x=0} -1 \end{cases} \quad -\Delta$$

$$f(x) = g(x)$$

$$\begin{cases} f(x) = x\sqrt{x} \rightarrow x \geq 0 \Rightarrow [0, +\infty) \xrightarrow{x=1} 1\sqrt{1} \\ g(x) = \sqrt{x^3} \rightarrow x^3 \geq 0 \Rightarrow x \geq 0 \rightarrow g(x) = \sqrt{x^3 \cdot x} = |x|\sqrt{x} \xrightarrow{x=1} \sqrt{1} = 1 \end{cases} \quad -\Delta$$

$$f(x) = g(x)$$

$$\begin{cases} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] \Rightarrow 0 \leq \sqrt{x} - \lfloor \sqrt{x} \rfloor < 1 \Rightarrow [\sqrt{x} - \lfloor \sqrt{x} \rfloor] = 0 \Rightarrow D_f = [0, +\infty) \\ g(x) = \sqrt{x - |x|} \Rightarrow x - |x| \geq 0 \Rightarrow x \geq |x| \Rightarrow [0, +\infty) \end{cases} \quad -\Delta$$

$$f(x) = g(x)$$

$$\text{أ) } \left(\frac{f+g}{f-g} \right)(1) \quad \frac{f(1)+g(1)}{f(1)-g(1)} = \frac{1+1}{1-1} = \frac{2}{0} = \boxed{\infty} \quad -\Delta$$

$$\text{ب) } \left(\frac{f+g}{f-g} \right)(2) \quad \frac{f(2)+g(2)}{f(2)-g(2)} = \frac{2+2}{2-2} = \frac{4}{0} = \boxed{\infty} \quad -\Delta$$

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

$$\text{أ) } g(x) = f(3x-1) \quad x = -2, -1, 0, 1, 2 \quad , \quad 3x-1 = -\frac{1}{3}, 0, \frac{1}{3}, 1, \frac{4}{3} \quad -\Delta$$

$$g = \left\{ \left(-\frac{1}{3}, 2\right), (0, 1), \left(\frac{1}{3}, 0\right), (1, 1), \left(\frac{4}{3}, -1\right) \right\}$$

$$\text{ب) } h(x) = f(|x|) \quad x = -2, -1, 0, 1, 2 \Rightarrow |x| = 0, 1, 2 \Rightarrow x = 0, \pm 1, \pm 2$$

$$h = \left\{ (-2, -1), (-1, 1), (0, 0), (1, 1), (2, -1) \right\}$$