

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

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

$$= y(\sqrt{y-\sqrt{y}}) + y(\sqrt{y+\sqrt{y}}) + y = y(\sqrt{y-\sqrt{y}} + \sqrt{y+\sqrt{y}} + y) \Rightarrow \boxed{y\sqrt{y} + y}$$

$$\Rightarrow -\delta f(x) = y_0 x^y + x \Rightarrow f(x) = -\frac{y_0 x^y}{\delta}$$

$$\begin{aligned} (n+1)f(n) - n f(n+1) &= n^2 - m n + m - 1 & f(0) &= ? \\ n=0 \Rightarrow 1 f(0) &= m-1 \\ n=1 \Rightarrow 2 f(0) &= 1 + m + m - 1 = 2m+1 \end{aligned} \quad \left. \vphantom{\begin{aligned} (n+1)f(n) - n f(n+1) &= n^2 - m n + m - 1 \\ n=0 \Rightarrow 1 f(0) &= m-1 \\ n=1 \Rightarrow 2 f(0) &= 1 + m + m - 1 = 2m+1 \end{aligned}} \right\} \begin{aligned} f(0) &= \frac{m-1}{1} = \frac{0+1}{1} \\ 1m-1 &= 1m+1 \\ 1m &= 1+1 \quad m \in \mathbb{N} \end{aligned}$$

$$f(x) = \frac{3x^2 - 11x + 9}{x} \quad f(-1) = ?$$

$$f(x) = ax + b$$

$$ax + b + \frac{a}{x} + b = \frac{ax^2 + bx + a}{x} = \frac{3x^2 - 11x + 9}{x} \Rightarrow \begin{aligned} a &= 3 \\ b &= -11 \end{aligned}$$

$$f(x) = 3x - 9 \Rightarrow f(-1) = -3 - 9 = -12$$

$$\frac{1}{x-1} : f(-1) + f(-1) = 2f(-1) = \frac{3+11+9}{-1} = -12$$

$$\begin{cases} f(x) = (x-1)\sqrt{1-x} & D_f = (-\infty, 1] \\ g(x) = -\sqrt{(1-x)^3} & D_g = (-\infty, 1] \end{cases}$$

$$\Rightarrow f = g \Rightarrow \sqrt{(x-1)\sqrt{1-x}} = -\sqrt{(1-x)^3} \Rightarrow \sqrt{(x-1)\sqrt{1-x}} = -\sqrt{(1-x)^3}$$

(1-x) > 0 ⇒ 1-x > 0, x < 1

$$\begin{cases} f(x) = x\sqrt{x} & D_f = [0, \infty) \\ g(x) = \sqrt{x^3} & D_g = [0, \infty) \end{cases}$$

x > 0 ⇒ x > 0

$$\Rightarrow f = g \Rightarrow x\sqrt{x} = \sqrt{x^3}$$

x > 0 ⇒ x > 0

$$\begin{cases} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] & D_f = [0, \infty) \\ g(x) = \sqrt{x - |x|} & D_g = [0, \infty) \end{cases}$$

x > 0, x - |x| > 0

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

⇒ f = g

$$f = \{(1, 2), (2, 3), (3, 1), (0, 0)\} \quad g = \{(-1, 1), (1, 1), (2, 3), (3, 8), (0, 2), (\sqrt{2}, 1)\}$$

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

$$\text{ب) } \left(\frac{f+g}{f-g}\right)(2) = \frac{3+3}{3-3} = \frac{6}{0} \quad \text{غير معرف}$$

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

$$f(x) = \{(2, 1), (-1, 4), (0, 8), (-2, 2), (3, -1)\}$$

$$\text{الف) } g(x) = f(3x-1) = \{(1, 1), (0, 4), (\frac{1}{3}, 8), (\frac{-1}{3}, 2), (\frac{2}{3}, -1)\}$$

$$3x-1=2 \Rightarrow x=1$$

$$3x-1=1 \Rightarrow x=2$$

$$3x-1=0 \Rightarrow x=\frac{1}{3}$$

$$3x-1=2 \Rightarrow x=1$$

$$3x-1=1 \Rightarrow x=2$$

$$3x-1=0 \Rightarrow x=\frac{1}{3}$$

$$\text{ب) } h(x) = f(|x|) = \{(2, 1), (0, 8), (3, -1), (-3, -1), (-2, 1)\}$$

$$|x| \neq -1$$

$$|x| \neq -2$$

$$|x| = 2$$

$$x = \pm 2$$

$$|x| = 0 \quad x = 0$$

$$|x| = 3$$

$$x = \pm 3$$