

$$\begin{aligned} f(a) &= (a+1)v = va + v \rightarrow v f(a) = 1v + 1va \\ f(-v) &= 1v + v(-v) = 1v - v \rightarrow f(-v) + a = 1v - v + a = 1v + a - v \end{aligned} \quad \left\{ \begin{aligned} 1v + 1va &= 1v + a - v \\ 1va &= -1v \\ a &= -1/1 \end{aligned} \right. \quad (1)$$

$$f(1+\sqrt{v}) = \sqrt{1+\sqrt{v}} + \frac{1}{\sqrt{1+\sqrt{v}}} + 1 \quad f(1-\sqrt{v}) = \sqrt{1-\sqrt{v}} + \frac{1}{\sqrt{1-\sqrt{v}}} + 1 \quad (2)$$

$$\begin{aligned} (\sqrt{1+\sqrt{v}} + \sqrt{1-\sqrt{v}}) + \left(\frac{1}{\sqrt{1+\sqrt{v}}} + \frac{1}{\sqrt{1-\sqrt{v}}} \right) + 1 &= \left(\frac{\sqrt{1+\sqrt{v}}}{\sqrt{1+\sqrt{v}}} + \frac{\sqrt{1-\sqrt{v}}}{\sqrt{1-\sqrt{v}}} \right) + \left(\frac{\sqrt{v}}{\sqrt{v}+1} + \frac{\sqrt{v}}{\sqrt{v}-1} \right) + 1 = \\ &= \frac{1\sqrt{v}}{\sqrt{v}} + \frac{\sqrt{v}-\sqrt{v}+\sqrt{v}+\sqrt{v}}{v-1} + 1 = \frac{2\sqrt{v}+2\sqrt{v}}{v-1} + 1 = 2\sqrt{v} + 1 \end{aligned}$$

$$v f(-x) - v f(x) = v(-x)^v - (-x) = vx^v + x \quad (3)$$

$$v f(x) - v f(-x) = vx^v - vx$$

$$v f(-x) - v f(x) = vx^v + vx$$

$$-2v f(x) = vx^v + vx$$

$$f(x) = -\frac{1}{2}x^v - \frac{1}{2}x$$

$$(v+1)f(0) - v(0)f(0+v) = f(0)^v - m(0) + v m - 1 \quad (4)$$

$$v f(0) = vm - 1$$

$$f(0) = \frac{vm-1}{v}$$

$$(ax+b) + \left(\frac{a}{x} + b \right) = \frac{vx^v - vx + v}{x} \quad f(x) = vx - 4 \quad (5)$$

$$ax + \frac{a}{x} + vb = vx - vx + \frac{v}{x}$$

$$\rightarrow v$$

$$\rightarrow -4$$

$$f(-1) = v(-1) - 4 = -9$$

$$f: 1-x \in \mathbb{R}_+ \rightarrow x \in \mathbb{R}_+ \quad D_f = (-\infty, 1] \quad (6)$$

$$g: (1-x)^v \in \mathbb{R}_+ \rightarrow 1-x \in \mathbb{R}_+ \quad x \in \mathbb{R}_+ \quad D_g = (-\infty, 1] \quad \left\{ \begin{aligned} D_f &= D_g \\ \rightarrow f &= g \end{aligned} \right.$$

$$f(x) = -\sqrt{(x-1)^v(1-x)}$$

$$= -\sqrt{(1-x)^v(1-x)}$$

$$= -\sqrt{(1-x)^{v+1}} = g(x)$$

$$f: x \in \mathbb{R}_+ \quad D_f = [0, +\infty) \quad (7)$$

$$g: x^v \in \mathbb{R}_+ \quad x \in \mathbb{R}_+ \quad D_g = [0, +\infty)$$

$$f(x) = x\sqrt{x}$$

$$x = \sqrt{x^2}$$

$$f(x) = \sqrt{x^2} \cdot \sqrt{x} = \sqrt{x^3} = g(x)$$

$$f(x) = [\sqrt{x} - \sqrt{x}] = [x-x] = 0 \quad f \neq g \quad (8)$$

$$g(x) = \sqrt{x} - |x| = x - x = -x$$

$$D_f \cap D_g : \{0, 1, 2, 3\}$$

(9)

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

$$\text{ب) } \frac{f(2) + g(2)}{f(2) - g(2)} = \frac{2+2}{2-2} = \text{تعیین نشده}$$

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

$$\text{الف) } \begin{aligned} 3x - 1 &= 2 \\ 3x &= 3 \\ x &= 1 \end{aligned}$$

$$g(1) = f(2) = 1$$

$$\begin{aligned} 3x - 1 &= -1 \\ 3x &= 0 \\ x &= 0 \end{aligned}$$

$$g(0) = f(-1) = 2$$

$$\begin{aligned} 3x - 1 &= 0 \\ 3x &= 1 \\ x &= \frac{1}{3} \end{aligned}$$

$$g\left(\frac{1}{3}\right) = f(0) = 0$$

$$\begin{aligned} 3x - 1 &= -2 \\ 3x &= -1 \\ x &= -\frac{1}{3} \end{aligned}$$

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

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$$\begin{aligned} 3x - 1 &= 4 \\ 3x &= 5 \\ x &= \frac{5}{3} \end{aligned}$$

$$g\left(\frac{5}{3}\right) = f(4) = -1$$

ب) $\frac{f(x) + g(x)}{f(x) - g(x)}$

$$|x| = 2 \rightarrow x = 2, x = -2$$

$$|x| = 3 \rightarrow x = 3, x = -3$$

$$|x| = 0 \rightarrow x = 0$$

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