

درجہ اولیٰ

$$f(x) = \begin{cases} x^2 - 1 & (x) > 1 \Rightarrow x > 1 \\ x^2 + 1 & (x) < 1 \Rightarrow x < 1 \end{cases} \Rightarrow y = \begin{cases} \sqrt{(x^2 - 1) - 2 + 1} & x > 1 \\ \sqrt{(x^2 + 1) - 2 + 1} & x < 1 \end{cases}$$

$$\Rightarrow y = \begin{cases} \sqrt{x^2 - 2} & x > 1 \Rightarrow x > 1 \\ \sqrt{x^2} & x < 1 \Rightarrow -\frac{1}{x} < x < 1 \end{cases} \Rightarrow -\frac{1}{x} < x < 1 \Rightarrow y \in \left[-\frac{1}{x}, 1\right)$$

$$y = \frac{x(1x^2 + 1x^2 + 4x + 1)}{(1x + 1)^2} = \frac{x(1x + 1)^2}{(1x + 1)^2} \Rightarrow y = \frac{x}{1x + 1}$$

$$Dy = \mathbb{R} - \left\{-\frac{1}{x}\right\}$$

$$f(x) = \begin{cases} \frac{x^2 + 1x^2 - 2 + 1}{x^2 - 1} = \frac{x^2(2 + 1) - 1(2 + 1)}{x^2 - 1} = \frac{(x^2 - 1)(2 + 1)}{x^2 - 1} = \frac{2 + 1}{x \neq 1} \\ \frac{ax + 1}{2 + b} \end{cases}$$

$$f(2) = g(2) \Rightarrow 2 + c = 2 + 1 \Rightarrow c = 1, \quad g(1) = f(1) \Rightarrow 1 + 1 = \frac{a + 1}{b + 1} \Rightarrow 1b + 1 = a + 1$$

$$g(-1) = f(-1) \Rightarrow (-1) + 1 = \frac{-a + 1}{-1 + b} \Rightarrow b - 1 = -a + 1$$

$$\Rightarrow \begin{cases} 1b - a = -1 \\ b + a = 2 \end{cases} \Rightarrow \begin{cases} b = \frac{1}{2} \\ a = \frac{3}{2} \end{cases} \Rightarrow b + c = \frac{1}{2} + 1 = \frac{3}{2}$$

$$\left. \begin{aligned} g(x) &= \frac{x^2 - 1}{x^2 + ax + b} \\ f(x) &= \frac{x + 1}{2 - c} = \frac{x^2 - 1}{x^2 - (c + 1)x + c} \end{aligned} \right\} \Rightarrow \begin{aligned} &\Rightarrow x^2 + ax + b = x^2 - (c + 1)x + c \\ &\Rightarrow a = -c - 1, b = c \end{aligned}$$

$$Df = \mathbb{R} - \{c\} \Rightarrow Dy = \mathbb{R} - \{c\} \Rightarrow g(x) = \frac{x^2 - 1}{(x - c)^2} \Rightarrow x^2 - 1 = (x - c)^2 \Rightarrow x^2 - 2cx + c^2 = x^2 - 1 \Rightarrow a = -2c, b = c^2$$

$$-C - 1 = -2C \Rightarrow C = 1, b = 1, a = -2 \Rightarrow a + b + C = -1 + 1 + 2 = 2$$

$$\begin{aligned} f(x+1) &= (2-x)^2(x) = (x^2 - 4x + 4)(x) = x^3 - 4x^2 + 4x \\ f(-x+1) &= (-2+x)^2(-x) = (x^2 - 4x + 4)(-x) = -x^3 + 4x^2 - 4x \end{aligned} \quad \left\{ + \right.$$

$$\Rightarrow g(x) = 8x^3$$

$$f(1-x) = \begin{cases} \sqrt{2+x} & x \leq 0 \\ \varepsilon\sqrt{2} & x > 0 \end{cases} \quad \begin{aligned} x=1 &\Rightarrow f(1) = \varepsilon\sqrt{1} = \varepsilon \\ x=-1 &\Rightarrow f(-1) = \sqrt{1+2} = 1 \end{aligned}$$

$$f(2+\sqrt{2}) = 2^{\varepsilon} \cdot \varepsilon \Rightarrow f(4) = \varepsilon^{\varepsilon} + \varepsilon \cdot \varepsilon = \varepsilon^2 + \varepsilon^2 = 2\varepsilon^2 \Rightarrow f(4) = 2\varepsilon^2$$

$$\begin{aligned} f(x-1) &= (2-x)^2 \cdot (x-1) \\ f(1-x) &= (1-x)^2 + (1-x) = -((x-1)^2 \cdot (x-1)) = -f(x-1) \\ \Rightarrow f(x-1) + f(1-x) &= 0 \end{aligned}$$

$$\begin{aligned} \mathcal{H} - g = \{(1, k)\} &\Rightarrow \mathcal{H} \cap g = 1 \\ \mathcal{H}: x > \frac{\varepsilon}{2} &\Rightarrow \mathcal{H} = \left[\frac{\varepsilon}{2}, +\infty\right) \\ \mathcal{G}: x \leq \frac{b}{\varepsilon} &\Rightarrow \mathcal{G} = (-\infty, \frac{b}{\varepsilon}] \end{aligned}$$

$$\Rightarrow \frac{\varepsilon}{\varepsilon} a = \frac{b}{\varepsilon} = 1 \Rightarrow \begin{aligned} b &> \varepsilon \\ a &> \frac{\varepsilon}{2} \end{aligned}$$

$$\begin{aligned} f(1) &= k-1 \Rightarrow f(1) = 2k-2 \\ g(1) &= \varepsilon k \end{aligned} \quad \left\{ \Rightarrow \begin{aligned} f(1) - g(1) &= 2k-2 - \varepsilon k = -k-2 \\ -k-2 &= k \Rightarrow k = -1 \end{aligned} \right.$$

$$\Rightarrow \varepsilon a - \frac{b}{2} - k = \varepsilon\left(\frac{\varepsilon}{2}\right) - \frac{\varepsilon}{2} - (-1) = \varepsilon$$

$$P_{f \times g} = P_f \cap P_g = \{1, V\}$$

$$\left. \begin{array}{l} P_f: m-x \geq 0 \Rightarrow x \leq m \Rightarrow P_f = (-\infty, m] \\ P_g: x+2 \geq 0 \Rightarrow x \geq -1 \Rightarrow P_g = [-1, +\infty) \end{array} \right\} \Rightarrow [-1, m] = \{1, V\}$$

$$\Rightarrow m = V \Rightarrow f(x) = \sqrt{V-x} + n$$

$$f - g(x) = f(x) - g(x) = 4\sqrt{x}$$

$$g(x) = \sqrt{x(x)+x} = x\sqrt{x}$$

$$f(x) = \sqrt{V-x} + n = x + n$$

$$\Rightarrow 4\sqrt{x} = x + 2 - x\sqrt{x} \Rightarrow n = 1\sqrt{x} - x$$

$$\Rightarrow n+m = 1\sqrt{x} - x + V = 1\sqrt{x} + \omega$$