

$$f(x) = \begin{cases} 2x-1 & ; [x] \geq 1 \rightarrow x \geq 0 \\ \varepsilon x + c & ; [x] < 1 \rightarrow x < 0 \end{cases}$$

$$\Rightarrow f(x) = \begin{cases} 2x-1 & x \geq 0 \\ \varepsilon x + c & x < 0 \end{cases}$$

$$\Rightarrow D_f = \left[-\frac{\varepsilon}{\varepsilon}, +\infty\right)$$

$$\Rightarrow y = \begin{cases} \sqrt{(2x-1)-x+1} & x \geq 0 \\ \sqrt{(\varepsilon x + c)-x+1} & x < 0 \end{cases} \Rightarrow \begin{cases} \sqrt{x} & x \geq 0 \\ \sqrt{\varepsilon x + c} & x < 0 \end{cases} \Rightarrow \begin{cases} \sqrt{x} & x \geq 0 \\ \sqrt{\varepsilon x + c} & x < 0 \end{cases} \Rightarrow -\frac{\varepsilon}{\varepsilon} x < 0$$

$$y = \frac{3(1x^3 + 12x^2 + 4x + 1)}{(2x+1)^3} = \frac{3(2x+1)^3}{(2x+1)^3} = \frac{3}{2x+1} \Rightarrow D_y = \mathbb{R} - \left\{-\frac{1}{2}\right\}$$

$\hookrightarrow 2x+1 \neq 0 \Rightarrow x \neq -\frac{1}{2}$

$$f(x) = \begin{cases} \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} = \frac{x^2(x+2) - 1(x+2)}{x^2 - 1} = \frac{(x+2)(x^2 - 1)}{x^2 - 1} = x+2 \\ \frac{ax+b}{x+c} \end{cases} \quad \begin{matrix} x \neq \pm 1 \\ x \neq -1 \end{matrix}$$

$$x+c = x+2 \Rightarrow c=2 \quad \leftarrow \text{تابع } f \text{ در } x \text{ برابرند} \Rightarrow \text{شعبه}$$

$$\begin{aligned} g(x) = f(x) & \xrightarrow{x=1} g(1) = f(1) \Rightarrow 1+2 = \frac{a+2}{b+1} \Rightarrow 3b+3 = a+2 \\ & \xrightarrow{x=-1} g(-1) = f(-1) \Rightarrow (-1)+2 = \frac{-a+2}{b-1} \Rightarrow b-1 = -a+2 \end{aligned} \Rightarrow \begin{cases} 3b-a = -1 \\ b+a = 3 \end{cases} \Rightarrow \begin{cases} b=2 \\ a=1 \end{cases}$$

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

$$f(x) = g(x) \Rightarrow Df = Dg \Rightarrow Dg = \mathbb{R} - c \Rightarrow g(x) = \frac{x^2-1}{(x-c)^2} \Rightarrow \text{دامنه بصورت } \mathbb{R} - c$$

$$\Rightarrow x^2+ax+b = x^2-2cx+c \Rightarrow \begin{cases} a = -2c \\ b = c \end{cases} \quad -c-1 = -2c \Rightarrow \begin{cases} c=1 \\ b=1 \\ a=-2 \end{cases} \quad a+b+c = -2+1+1=0$$

$$f(x+1) = (x+2)^2(x) = (x^2+\varepsilon x+\varepsilon)(x) = x^3+\varepsilon x^2+\varepsilon x$$

$$f(1-x) = (-x-2)^2(-x) = (x^2+\varepsilon x+\varepsilon)(-x) = -x^3-\varepsilon x^2-\varepsilon x$$

$$g(x) = -1x^2$$

$$g(x) = x^3 - \varepsilon x^2 + \varepsilon x - x^3 - \varepsilon x^2 - \varepsilon x = -1x^2$$

$$f(1-x) = \begin{cases} \sqrt{x} + 2 & x \in \mathbb{R} \\ \sqrt{x} & x \in \mathbb{R} \end{cases}$$

-9

$$\begin{aligned} x \neq 1 &\Rightarrow f(-1) = \sqrt{-1} + 2 \\ x = 1 &\Rightarrow f(1) = \sqrt{1} + 2 = 3 \end{aligned} \Rightarrow f(1) + f(-1) = 1 + 2 = 3$$

$$f(x + \sqrt{x}) = x^{\frac{1}{2}} + 2x \xrightarrow{x=9} f(9) = 3 + 2 \cdot 9 = 21 \quad f(9) = 21$$

-V

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

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

$$\Rightarrow f(x-1) + f(1-x) = f(x-1) - f(x-1) = 0$$

-A

$$\forall f, g = \{(1, K)\} \Rightarrow D_{f \cap g} = 1$$

$$\left. \begin{aligned} Df: x \geq \frac{b}{c} \Rightarrow Df = [\frac{b}{c}, +\infty) \\ Dg: x \leq \frac{b}{c} \Rightarrow Dg = (-\infty, \frac{b}{c}] \end{aligned} \right\} \Rightarrow \frac{b}{c} = \frac{b}{c} = 1 \Rightarrow \begin{aligned} b &= c \\ a &= \frac{c}{b} \end{aligned}$$

-9

$$\Rightarrow \left\{ \begin{aligned} f(1) &= K-1 \Rightarrow 2f(1) = 2K-2 \\ g(1) &= 2K \end{aligned} \right\} \Rightarrow 2f(1) - g(1) = 2K-2 - 2K = -2$$

$$-2 = K \Rightarrow 2K = -2 \Rightarrow \boxed{K = -1} \quad 3a - \frac{b}{c} - K = 3(\frac{c}{c}) - \frac{c}{c} - (-1) = 3 - 1 + 1 = 3$$

-1

$$D_{f \cap g} = D_g \cap D_f = [-1, V]$$

$$Df = x \leq m \Rightarrow Df = (-\infty, m]$$

$$Dg = x \geq -1 \Rightarrow Dg = [-1, +\infty)$$

$$\Rightarrow [-1, m] = [-1, V]$$

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

$$f - g(c) = f(2) - g(2) = 9\sqrt{2}$$

$$g(c) = \sqrt{4+2} = \sqrt{6} = 2\sqrt{3}$$

$$f(c) = \sqrt{V-c} + n = 2 + n$$

$$\Rightarrow n + 2 - 2\sqrt{2} = 9\sqrt{2} \Rightarrow n + 2 = 11\sqrt{2} \Rightarrow n = 11\sqrt{2} - 2$$

$$n + m = 11\sqrt{2} - 2 + V = 11\sqrt{2} + 5$$