

19, 5

1- (۲)

$$f(x) - x + 1 \geq 0$$

$$f(x) = \begin{cases} 2x-1; [x] > 5 \rightarrow x > 5 \\ 5x+3; [x] \leq 5 \rightarrow x \leq 5 \end{cases}$$

$$\left. \begin{aligned} x > 5 &\rightarrow 2x-1-x+1 \geq 0 \rightarrow x \geq 0 \xrightarrow{\text{اشتقاق}} [5, +\infty) \\ x \leq 5 &\rightarrow 5x+3-x+1 \geq 0 \rightarrow 4x+4 \geq 0 \rightarrow x \geq -\frac{4}{4} \xrightarrow{\text{اشتقاق}} [-\frac{4}{4}, 5) \end{aligned} \right\} \xrightarrow{\text{اجتماع}} [-\frac{4}{4}, +\infty)$$

$$\frac{25x^3 + 34x^2 + 11x + 3}{(5x^2 + 5x + 1)^2}$$

2- (۲)

$$\text{مخرج: } 3(12x^3 + 12x^2 + 4x + 1)$$

$$\text{مخرج: } \frac{(5x^2 + 5x + 1)^2}{(5x^2 + 5x + 1)^2} = (5x^2 + 5x + 1)^2$$

$$\frac{3(5x^2 + 5x + 1)^2}{(5x^2 + 5x + 1)^2} = \frac{3}{5x^2 + 5x + 1}$$

$$\text{مخرج} \rightarrow (5x^2 + 5x + 1)^2 = 0 \rightarrow (5x^2 + 5x + 1) = 0 \rightarrow x = -\frac{1}{5} \rightarrow D = \mathbb{R} - \left\{-\frac{1}{5}\right\}$$

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

$$f(x) = g(x) \text{ چون } f \text{ بی‌بسته است}$$

(۲)

$$\frac{x^3 + 2x^2 - x - 2}{(x-1)(x+1)} \rightarrow \frac{x^2(x+2) - (x+2)}{(x-1)(x+1)} \rightarrow \frac{(x+2)(x-1)(x+1)}{(x-1)(x+1)} \left\{ \begin{aligned} &x+2; x \neq \pm 1 \end{aligned} \right.$$

رفتار تابع در نزدیکی

نقاط تعریف نشده مشابه

یعنی $x+2$ است

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

$$\frac{ax+b}{x+c} \xrightarrow{x=1} \frac{a+b}{1+c} = 3 \rightarrow a+b = 3+3c \rightarrow 3-b+2 = 3+3c \rightarrow 4-b = 3+3c \rightarrow 4-b = 3+3c \rightarrow b = 1, c = \frac{1}{3} \rightarrow a = \frac{2}{3}$$

$$g(x) = f(x) \rightarrow g(x) = x+2 \rightarrow c = \frac{1}{3}$$

$$b+c = \frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1$$

نیر یا (مینی)

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

۳. (۵)

$$g(x) = \frac{x^2-1}{x^2+ax+b} \rightarrow \frac{(x-1)(x+1)}{(x-1)(x+c)} \rightarrow x^2+ax+b = \underbrace{(x-1)(x+c)}$$

$$x^2-x+cx-c = x^2-(c+1)x+c$$

$$x^2+ax+b = x^2-(c+1)x+c$$

$$b=c, -c-1=a$$

$$a+b+c = -c-1+c = -1$$

مقدار عددی خواهم

صفحه آخر...

$$f(x) = (x-3)^2(x-1)$$

۴. (۲)

$$g(x) = f(x+1) + f(1-x)$$

$$f(x+1) = (x+1-3)^2(x+1-1) = (x-2)^2x = (x^2-4x+4)x = x^3-4x^2+4x$$

$$f(1-x) = (1-x-3)^2(1-x-1) = (-x-2)^2(-x) = (x^2+4x+4)(-x) = -x^3-4x^2-4x$$

$$g(x) = x^3-4x^2+4x - x^3-4x^2-4x = -8x^2$$

$$f(1-2x) = \begin{cases} \sqrt[3]{2x} + 2 & x \leq 0 \\ \sqrt[3]{2x} & x > 0 \end{cases}$$

$$1-2x = -1 \rightarrow 2x = 2 \rightarrow x = 1$$

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

$$\left. \begin{aligned} f(1) &= \sqrt[3]{-1} + 2 = 1 \\ f(-1) &= \sqrt[3]{-1} = -1 \end{aligned} \right\} \xrightarrow{1+5} \boxed{0}$$

$$x+\sqrt{x} = 4 \rightarrow x=9$$

$$f(x) = \underbrace{f^{\frac{1}{204}}}_{\frac{1}{204}} + \underbrace{g(\frac{1}{12})}_{\frac{1}{12}} = \boxed{1}$$

۵. (۲)

(۲) - ۱

$$f(x) = x^3 + x$$

$$\left. \begin{aligned} f(x-1) &= (x-1)^3 + x-1 = x^3 - 3x^2 + 3x - 1 + x - 1 = x^3 - 3x^2 + 4x - 2 \\ f(1-x) &= (1-x)^3 + 1-x = 1 - 3x + 3x^2 - x^3 + 1 - x = -x^3 + 3x^2 - 4x + 2 \end{aligned} \right\} \xrightarrow{2+2} 0 \quad \checkmark$$

- ۹

(۲)

$$f(x) = \sqrt{c-x} + k - 1$$

$$g(x) = \sqrt{b-x} + 3k$$

$$f-g = \{(1, k)\}$$

$$3a - \frac{b}{r} = k$$

$$c - 3a = 0 \rightarrow c = 3a \rightarrow a = \frac{c}{3}$$

$$b - c = 0 \rightarrow b = c$$

$$\rightarrow 3k + r = 0 \rightarrow 3k = -r \rightarrow k = -\frac{r}{3}$$

$$3 \times \frac{c}{3} - \frac{c}{r} + 1 = c - r + 1 = 0$$

$$f(1) = \sqrt{c-3a} + k - 1$$

$$g(1) = \sqrt{b-r} + 3k$$

$$r(\sqrt{c-3a} + k - 1) - \sqrt{b-r} - 3k = k$$

$$r\sqrt{c-3a} + rk - r - \sqrt{b-r} - 3k = k$$

$$\frac{r\sqrt{c-3a}}{0} - \frac{\sqrt{b-r}}{0} = \frac{rk+r}{r(k+1)}$$

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

$$g(x) = \sqrt{2x+r}$$

$$D_{f \cap g} = [-1, \sqrt{r}]$$

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

$$D_f \cap D_g = [-1, \sqrt{r}]$$

$$D_g \Rightarrow 2x+r \geq 0 \rightarrow 2x \geq -r \rightarrow x \geq -\frac{r}{2} \rightarrow [-\frac{r}{2}, +\infty)$$

$$D_f \Rightarrow m-x \geq 0 \rightarrow m \geq x \rightarrow (-\infty, m]$$

$$m = \sqrt{r} \leftarrow [-1, m] = \text{استدلال}$$

$$\sqrt{m-x} + n = 4\sqrt{r} \rightarrow x+n = 4\sqrt{r} \rightarrow n = 4\sqrt{r} - x$$

$$m+n = \sqrt{r} + 4\sqrt{r} - x = 5\sqrt{r} - x$$

(۲) - ۱۰

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

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

$$\left. \begin{aligned} f(x) &= \sqrt{m-x} + n \\ g(x) &= \sqrt{x} \end{aligned} \right\} \sqrt{m-x} + n - \sqrt{x} = 4\sqrt{r} \rightarrow$$

$$\sqrt{m-x} + n = 4\sqrt{r}$$

$$D_f = \mathbb{R} - \{c\}$$

۴- چون دو تابع با هم برابرند دامنه‌های برابر داشتند:

یعنی $g(x)$ در خارج ریشه ضاعف داشته:

$$n^r + an + b = (n - c)^r = n^r - rcn + c^r \rightarrow \begin{cases} a = -rc \\ b = c^r \end{cases}$$

$$g(n) = f(n) \rightarrow$$

همچنین ضابطه‌های یکسان دارند:

$$\frac{n^r - 1}{n^r + an + b} = \frac{n+1}{n-c} \rightarrow \frac{(n-1)(\cancel{n+1})}{(n-c)^r} = \frac{\cancel{n+1}}{\cancel{n-c}} \rightarrow \begin{cases} c = 1 \\ a = -2 \\ b = 1 \end{cases} \left\{ \begin{array}{l} \text{جواب: } \boxed{5} \end{array} \right.$$