

$$f(x) = \begin{cases} x^{n-1} & x \geq 0 \\ x^n + x^{n+1} & x < 0 \end{cases}$$

سوال ①

$x \geq 0$
 $x^n + x^{n+1} \geq 0$
 $x \geq -\frac{x^n}{x^{n+1}} \Rightarrow x \geq -\frac{1}{x}$ ①

① + ⑤ $\Rightarrow \left[-\frac{1}{x}, +\infty\right)$

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

سوال ②

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

$x=0 \Rightarrow f(x) = \frac{-1}{-1} = 1 \Rightarrow c=1$

سوال ③

$g(x) = c$

$$\left. \begin{aligned} g(x) \xrightarrow{x \rightarrow 1} x &= \frac{a+x}{b+1} \\ g(x) \xrightarrow{x \rightarrow -1} 1 &= \frac{x-a}{b-1} \end{aligned} \right\} \Rightarrow \begin{aligned} a &= 1-b \\ b &= \frac{1}{x} \\ b+b &= \frac{0}{x} \end{aligned}$$

$x=0 \rightarrow \frac{-1}{c} = \frac{-1}{b} \rightarrow c=b$

سوال ④

$$\begin{aligned} x^n + ax + b &= (x-c)^n = x^n - nx^{n-1}c + nc^2 \Rightarrow \begin{cases} b=c^2 \\ b=c \end{cases} \\ a &= -nc = -1 \quad a+b+c=0 \end{aligned}$$

تحقق

$$(x-1)^n x + (x+1)^n (-x) = x((x-1)^n - (x+1)^n)$$

سوال ⑤

$= -1x^n$

$(-1)^n x = x \Rightarrow -1 = x \Rightarrow x = -1$

سوال ⑥

$1 - x^n = -1 \Rightarrow x^n = 2 \Rightarrow \sqrt[n]{2} = x$ ⑤ $\hookrightarrow \sqrt[n]{-1} + x = 1$

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

$$x + \sqrt{x} = 7 \Rightarrow t^2 + t - 7 = 0 \quad t = -1 \times$$

$$t = 1$$

$$\sqrt{x} = 1 \Rightarrow x = 1$$

$$f(x) = x^2 + x^2 \times 1 = 171$$

$$(x-1)^2 + (x-1) + (1-x^2) + (1+x) = 0$$

$$\left. \begin{aligned} f-g &= \{(1, k)\} \\ D_{g \cap f} &= \{1\} \\ D_f &= \{x \mid \frac{x}{k} a\} \\ D_g &= \{x \mid \frac{x}{k} b\} \end{aligned} \right\} \Rightarrow \frac{x}{k} a = \frac{b}{k} = 1$$

$$\Rightarrow ka = b = k$$

$$a = \frac{k}{k}$$

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

$$ka - \frac{b}{k} - k = 1 \quad k = -1$$

$$\left. \begin{aligned} x+t > 0 \\ x > -1 \end{aligned} \right\} D_f = [-1, \infty) \quad \left. \begin{aligned} m-x > 0 \\ m > x \\ x > m \end{aligned} \right\} \Rightarrow m = x$$

$$\left. \begin{aligned} g(m) &= \sqrt{x} = 1\sqrt{x} \\ f(x) - 1\sqrt{x} &= 1\sqrt{x} \end{aligned} \right\} \Rightarrow f(x) = 1\sqrt{x}$$

$$\sqrt{x-k} + k = 1\sqrt{x}$$

$$x = 1\sqrt{x} - k$$

$$k + m = 1\sqrt{x} - k + x = 1\sqrt{x} + 0$$