

($\lambda=0$) مشتق پذیر نیست $\Leftrightarrow$ تابع در $n=1$ باید مشتق پذیر باشد.

$\lambda=1$ تابع باید در $n=1$ مشتق پذیر باشد $\Rightarrow \frac{1^n}{1\sqrt{1}} = b \frac{1^n}{1\sqrt{1}} \Rightarrow b=1, a=0.5$

$a+b=2$

$\lambda=1 \Rightarrow f'(n) = \frac{-2(\sqrt[3]{n^2}) - (f-2n)(\frac{1}{\sqrt[3]{n}})}{(\sqrt[3]{n^2})^2} \Rightarrow f'(1) = -\frac{10}{3}$

$\lambda=1 \Rightarrow g'(1) = (-1 + \frac{1}{\sqrt[3]{n}}) \sqrt[3]{n^2} - \frac{1}{\sqrt[3]{n}} (2 - \lambda + \sqrt[3]{n}) = (\frac{\sqrt[3]{n}}{2} - 1) - \frac{1}{\sqrt[3]{n}} (1 + \sqrt[3]{n})$

$= \frac{\sqrt[3]{n}}{2} - 1 - \frac{1}{\sqrt[3]{n}} - \frac{\sqrt[3]{n}}{n} = \frac{\sqrt[3]{n}}{2} - 1 - \frac{1}{\sqrt[3]{n}} - \frac{\sqrt[3]{n}}{n}$ $f'(1) - 2g'(1) = -\frac{10}{3} + \frac{10}{3} - \frac{\sqrt[3]{n}}{3} = \frac{\sqrt[3]{n}}{3}$

باید تابع در $n=a$ مشتق پذیر و راست برابر و مقدار تابع برابر باشد.

① $b = -\frac{1}{a^2} \Rightarrow a^2 b = -1$

② $ab+c = \frac{1}{a} \Rightarrow a^2 b + ac = 1 \xrightarrow{a^2 b = -1} ac = +2$

~~$f'(n) = \begin{cases} 0 & n < a \\ m(n-a)^{m-1} & n \geq a \end{cases}$~~

$f'(n) = \begin{cases} 0 & n < a \\ m(n-a)^{m-1} & n \geq a \end{cases}$

$\begin{cases} m=0 \rightarrow f'_-(a) = f'_+(a) \cdot \times \\ m=1 \rightarrow f'_-(a) \neq f'_+(a) \checkmark \\ m \geq 2 \rightarrow f'_-(a) = f'_+(a) \cdot \times \end{cases}$
مقدار $m=1$

$g'(-\sqrt[3]{2}) f'(g(-\sqrt[3]{2})) = f \circ g(-\sqrt[3]{2})'$

$f \circ g = \frac{1}{\sqrt[3]{2g(n)}} = \frac{1}{\sqrt[3]{2}} \cdot \frac{1}{\sqrt[3]{n}} = n \rightarrow f \circ g' = 1$



$$① f(-1) = f(e) = \frac{e}{e}$$

$$② g'(x) = f(x) + 3f(3x+10)$$

$$③ g(-2) = f(-1) + 3f(e) = \boxed{4}$$

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

$$② f'(g) = g'(x) \times f'(g(x)) = -\frac{1}{x} (x^2-1)^{-\frac{1}{2}} \times 2x \times \frac{1}{\sqrt{x^2-1}} \times 2x$$

$$③ = -\frac{1}{x} \times 2x \times \frac{1}{\sqrt{x^2-1}} \times 2x = -4\sqrt{2} \quad \frac{-4\sqrt{2}}{-12\sqrt{2}} = \boxed{\frac{1}{3}}$$

$$① f'(e) = -a$$

$$② f'(e) - f(e) = 2a - 5 = 2$$

$$f''(e) = -2a - a$$

$$③ a = -\frac{e}{2}$$

$$f(e) = -\frac{1}{e}$$

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$$④ \frac{f(3)}{f'(3)} = \frac{1}{3}$$

$$\lim_{h \rightarrow 0} \frac{(f(a-h)-1)(f(a-h)-2)}{h(a-h)} = \frac{f(a-h)-f(a)}{h} \times \frac{f(a)-1}{a}$$

$$= -f'(a) \times \frac{1}{a} = \boxed{-\frac{a}{12}}$$

$$y = \frac{1}{x} + \frac{1}{e} \rightarrow a_1 = \frac{1}{e} \xrightarrow{\text{شیب خط عمود بر خط مماس}} a_2 = -2$$

$$y' = -\frac{1}{x^2} \rightarrow 2x - f = -2$$



$$\boxed{x=1, y=2}$$