

۱۸, ۱۷, ۵ تابع در $x=1$ مشتق است $\rightarrow f(x) = \lim_{x \rightarrow 1} f(x) \rightarrow a+1=b$ $f'_-(1) \neq f'_+(1)$ $f(x) = \begin{cases} a+1x & x < 1 \\ b\sqrt[3]{x^2} & x \geq 1 \end{cases}$ در صورت مشتق نده $\rightarrow$ در $x=1$ مشتق ده $f'_-(1) = \frac{2x}{2\sqrt{x^2}} = 1$ $f'_+(1) = \frac{b \cdot 2x}{3\sqrt[3]{x^4}} = \frac{2b}{3}$ $b = \frac{3}{2} \rightarrow a = \frac{1}{2} \rightarrow a+b = 2$ ۲	۱
$g(x) = \frac{\sqrt{(x-2)^2} + \sqrt{3x}}{\sqrt[3]{x^2}} = \frac{ x-2 + \sqrt{3x}}{\sqrt[3]{x^2}} \rightarrow g'(x) = \frac{-1 + \frac{3}{2\sqrt{3x}}}{\frac{2x}{3\sqrt[3]{x^4}}} \xrightarrow{x \neq 1} \frac{-1 + \frac{3}{2\sqrt{3}}}{\frac{2}{3}}$ $f'(x) = \frac{-2}{\frac{2x}{3\sqrt[3]{x^4}}} = \frac{-2}{\frac{2}{3}} = -3$ $f'(1) - 2g'(1) = -3 + 3 - \frac{9}{2\sqrt{3}} = -\frac{3\sqrt{3}}{2}$ ۱, ۷, ۵	۲
$f'_-(a) = f'_+(a) \rightarrow b = -\frac{1}{a^2}$ $f(a) = \lim_{x \rightarrow a} f(x) \rightarrow \frac{1}{a} = ab + c \rightarrow \frac{1}{a} = -\frac{1}{a} + c \rightarrow c = \frac{2}{a} \rightarrow ac = 2$ ۲	۳
$f'_-(a) = 0$ $f'_+(a) = m(x-a)^{m-1} \xrightarrow{در صورت مشتق نده} m-1=0 \rightarrow m=1 \rightarrow$ ۲	۴
$g'(-\sqrt[3]{2}) \neq (g'(\sqrt[3]{2})) = (f \circ g'(-\sqrt[3]{2}))' \rightarrow$ $g(-\sqrt[3]{2}) = \frac{1}{2x^3} \Rightarrow g'(x) = \frac{-6x^2}{4x^6} = \frac{6\sqrt[3]{4}}{16}$ $f'(-\sqrt[3]{2}) = \frac{1}{\sqrt[3]{2x} f'(x)} = \frac{3\sqrt[3]{4x^2}}{2} = \frac{3\sqrt[3]{\frac{1}{4}}}{2} = \frac{3}{2\sqrt[3]{4}}$ ۶, ۵	۵

$$\left. \begin{aligned} f(3) &= -3a - 5 \\ f'(3) &= -a \end{aligned} \right\} -a + 3a + 5 = 2 \rightarrow 2a = -3 \rightarrow a = -\frac{3}{2}$$

$$f(3) = \frac{9}{2} - 5 = -\frac{1}{2} \quad \frac{f(3)}{f'(3)} = \frac{-\frac{1}{2}}{-\frac{3}{2}} = \frac{1}{3}$$

(1, \sqrt{8})

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$$f \circ g(x) = g'(x) \times f(g(x))$$

$$g\left(\frac{3}{\sqrt{8}}\right) = 2 \quad g'(x) = (x^2 - 1)^{-\frac{1}{3}} \rightarrow -\frac{1}{3}(x^2 - 1)^{-\frac{4}{3}} \times 2x = \frac{-2x}{3\sqrt[3]{(x^2 - 1)^4}} \rightarrow g'(x) = -8\sqrt{2}$$

$$f'(2) = 32x = 64$$

$$\frac{-8\sqrt{2} \times 64}{-128\sqrt{2}} = 4$$

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$$g'(x) = f'(x+1) + 3f'(3x+10) = f'(-1) + 3f'(4) \xrightarrow{T=5} 4f'(-1) = 6$$

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$$\frac{f^2(5-h) - 3f(5-h) + 2}{h(5-h)} = \frac{(f(5-h)-1)(f(5-h)-2)}{h(5-h)} \rightarrow f(5)$$

$$f(5) = 2 \quad f'(x) = \sqrt[3]{x+3} + \frac{x-4}{3\sqrt[3]{(x+3)^2}} = 2 + \frac{1}{12} = \frac{25}{12}$$

$$\frac{25}{12} \times \frac{1}{5} = \frac{5}{12}$$

(1, \sqrt{8})

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$$6y = 3x + 1 \rightarrow y = \frac{1}{2}x + \frac{1}{2} \rightarrow f'(x) = -2$$

$$2x - 4 = -2 \rightarrow 2x = 2 \rightarrow x = 1$$

$$y = 2$$

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$$f(x) = \frac{x-r}{\sqrt{xr}} \rightarrow f'(1) = \frac{-r(\frac{r}{\sqrt{1}}) - \frac{r}{r}(1)^{-\frac{1}{2}}(\frac{r}{r})}{\sqrt{1}} = -\frac{1}{r}$$

$$g(x) = \frac{|x-r| + \sqrt{rx}}{\sqrt{xr}} \rightarrow g'(1) = \frac{(-1 + \frac{r}{\sqrt{r}})(1) - \frac{r}{r\sqrt{1}}(1+\sqrt{r})}{r\sqrt{1}}$$

$$g'(1) = -1 + \frac{r\sqrt{r}}{r} - \frac{r}{r} - \frac{r\sqrt{r}}{r} = -\frac{1}{r} - \frac{\sqrt{r}}{r}$$

$$f'(1) \cdot g'(1) = -\frac{1}{r} + \frac{1}{r} + \frac{r\sqrt{r}}{r} = \frac{\sqrt{r}}{r}$$

$$g(-\sqrt{r}) = \frac{1}{(\sqrt{r})^r - 1(-\sqrt{r})^r} = \frac{1}{-r-r} = -\frac{1}{r}$$

$$f(-\frac{1}{r}) = \frac{1}{\sqrt{-\frac{1}{r} - \frac{1}{r}}} = (-\frac{1}{r})^{-\frac{1}{r}} = -(r)^{-1 \times -\frac{1}{r}} = -r^{\frac{1}{r}} = -\sqrt[r]{r}$$

$\rightarrow \log(n) = n$

$$g'(x) \times f'(g(x)) = (x)' = 1$$

$$f(r) = -ra - a \quad f'(r) = -a$$

$$-a - (-ra - a) = r \rightarrow ra = r \rightarrow a = -\frac{r}{r}$$

$$-r(-\frac{r}{r}) - a = -\frac{1}{r}$$

$$\rightarrow \frac{f(r)}{f'(r)} = \frac{-\frac{1}{r}}{-\frac{r}{r}} = \frac{-1}{r}$$

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

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$$f'(a) = \sqrt[3]{a+3} + \frac{a-2}{\sqrt[3]{(a+3)^2}} \rightarrow -f'(a) = -(\sqrt[3]{a} + \frac{1}{\sqrt[3]{a^2}}) = 2 + \frac{1}{12} = -\frac{25}{12}$$

$$-\frac{25}{12} \times \frac{2-1}{a} = \boxed{-\frac{a}{12}}$$

تقریب مسبق $\rightarrow \frac{f(h) - f(a-h)}{h} = f'(a)$