

$$a+1=b \quad f(x) = \begin{cases} a+1/x & x < 1 \\ b\sqrt[3]{x} & x \geq 1 \end{cases}$$

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است

$$\rightarrow f'_-(1) = f'_+(1) \rightarrow 1 = b \times \frac{1}{\sqrt[3]{1}} \rightarrow b = 1$$

$$\rightarrow a+b=2 \quad \checkmark \quad a = 1$$

$$g(x) = -\sqrt{x} - \frac{(1-x)x}{3\sqrt{x}} + \frac{3\sqrt{x}}{2\sqrt{3x}} - \frac{2x\sqrt{3x}}{3\sqrt{x}} = \frac{-10-\sqrt{3}}{6}$$

$$f'(x) = -\frac{1}{2\sqrt{x}} - \frac{x(1-x)}{3\sqrt{x}} = \frac{-10}{3}$$

$$f'(1) - 2g'(1) = \frac{-10}{3} + \frac{10+\sqrt{3}}{3} = \frac{\sqrt{3}}{3} \quad \checkmark$$

$$ab+c = 1/a \text{ و } b = -1/x^2 \Rightarrow b = -1/a^2 \Rightarrow \frac{-1}{a} + c = 1/a \Rightarrow \frac{2}{a} = c$$

$$\Rightarrow ac=2 \quad \checkmark$$

$$\lim_{x \rightarrow a^+} = \lim_{x \rightarrow a^-} \Rightarrow b = b(x-a)^m \rightarrow m > 0, f_+(a) \neq f_-(a) \rightarrow 0 \neq m(x-a)^{m-1}$$

$$\rightarrow \frac{m \neq 0}{II} \text{ و } \frac{(x-a)^{m-1} \neq 0}{x \neq a} \rightarrow m-1 \leq 0 \rightarrow m < 1 \Rightarrow 0 < m < 1 \quad (0.18)$$

$$m=1 \rightarrow \begin{cases} f_-(a) = 0 \\ f_+(a) = 1 \end{cases} \rightarrow f'_-(a) \neq f'_+(a)$$

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$$g(x) f'(g(x)) = (f \circ g)'(x) \quad | \quad f(x) = -\sqrt{x} \rightarrow$$

$$g(x) = \frac{1}{2x^2} \text{ و } f(x) = \frac{1}{\sqrt{2x}} \rightarrow$$

$$f \circ g(x) = \frac{1}{\sqrt{2 \times \frac{1}{2x^2}}} = x \rightarrow (f \circ g)'(x) = 1 \quad \checkmark$$

$$\text{if } x=2 \quad y' = f'(x) \rightarrow -a = f'(2) \rightarrow$$

$$y = -2a - 6 \quad f(2) - f(2) = -a - (-2a - 6) = 2a + 6 = 2 \rightarrow a = -1/2 \quad \frac{f(2)}{f'(2)} = \frac{2a + 6}{-1/2} = -1/2 \quad \checkmark$$

(2)

$$f(x) = 2x [x^2 + 1/4]^2 \quad g(x) = 2 \quad f'(2) = 2\epsilon \quad \checkmark$$

(1)

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

$$\frac{2\epsilon \sqrt{x}}{-12\sqrt{x}} = -1/6 \quad g'(\frac{2}{\sqrt{x}}) = \frac{2}{\sqrt{x}} \times \frac{2}{\sqrt{x}} (\frac{2}{\sqrt{x}})^2 = \frac{4}{\sqrt{x}} \times \frac{2}{\sqrt{x}} = -\frac{2\sqrt{x}}{\sqrt{x}} = -2\sqrt{x} \rightarrow g'(\frac{2}{\sqrt{x}}) = -2\sqrt{x}$$

$$y' = g'(\frac{2}{\sqrt{x}}) f'(2) = -2\sqrt{x} \times 2\epsilon = 2 \times (-2\sqrt{x}) \rightarrow \text{برابر 2}$$

$$g'(2) = f'(2+1) + 2 f'(2+10) \quad g'(-2) = f'(-1) + 2 f'(\epsilon)$$

$$T=a \rightarrow f'(\epsilon) = f'(1) \rightarrow g'(2) = 2/2 + 2/2 = 2 \quad \checkmark$$

(2)

$$\text{HOP: } \lim_{h \rightarrow 0} \frac{-2 f'(a-h) f(a-h) + 2 f'(a-h)}{a-2h} = \lim_{h \rightarrow 0} \frac{-2 f'(a) f(a) + 2 f'(a)}{a}$$

$$= \frac{-2 \times \frac{2a}{12} + \frac{2 \times 2a}{12}}{a} = -2/12$$

(2)

$$f(a) = 2 \quad f'(x) = \sqrt{x+2} + \frac{x-2}{2\sqrt{x+2}} \rightarrow f'(a) = \frac{2a}{12}$$

$$y_1 = \frac{2x+1}{2} \rightarrow m_{y_1} = 1/2 \rightarrow n_{y_1} = -2 \rightarrow 2x-2 = -2 \rightarrow x=1$$

$$y_1 = 2 \quad (1, 2)$$

(2)