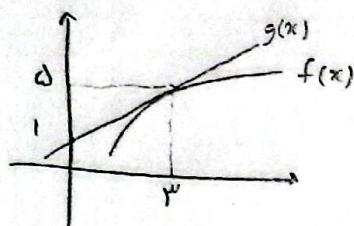


۱- $f'(3)$ برابر است با شیب خط $g(x)$ داریم:

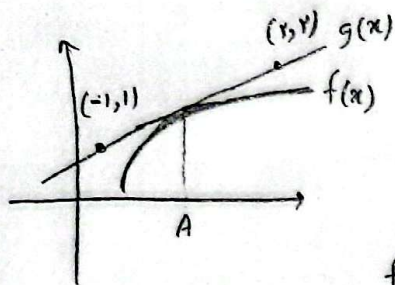


$$m_{g(x)} = \frac{\Delta y}{\Delta x} \rightarrow m = \frac{f}{3}$$

$$\rightarrow f'(3) = \frac{f}{3} \quad \checkmark$$

(۲)

۲- $f'(A)$ برابر شیب خط $g(x)$ است داریم:



$$m_{g(x)} = \frac{\Delta y}{\Delta x} \rightarrow m = \frac{1}{3} \quad \textcircled{1} \rightarrow g(x) = \frac{1}{3}x + \frac{f}{3}$$

$$f'(A) = \frac{1}{3} \quad \textcircled{1}$$

$$f(x) = g(x) \quad \text{چون } \Delta x = 0 \quad \sqrt{ax-1} = \frac{1}{3}x + \frac{f}{3}$$

$$\textcircled{1}^2 \rightarrow ax-1 = \frac{1}{9}x^2 + \frac{2f}{9}x + \frac{f^2}{9} \rightarrow \frac{1}{9}x^2 + (\frac{2f}{9} - a)x + \frac{f^2 + 9}{9} = 0$$

$$\Delta = 0 \rightarrow \left(\frac{2f}{9} - a \right)^2 = \frac{4(f^2 + 9)}{9} \rightarrow \begin{cases} \frac{2f}{9} - a = \frac{2}{9} \rightarrow a = -\frac{2}{9} \times D_f \\ \frac{2f}{9} - a = \frac{2}{9} \rightarrow a = 2 \quad \checkmark \end{cases} \quad \textcircled{2}$$

$$f(x) = \sqrt{2x-1} \quad x=2 \rightarrow f(2) = \sqrt{3} = 3 \quad \checkmark$$

$$y = \frac{x^2 + mx + 1}{x + 3} \quad \textcircled{1} \rightarrow y' = \frac{(2x+m)(x+3) - (x^2 + mx + 1)}{(x+3)^2} \rightarrow y' = \frac{x^2 + 4x + 3m - 1}{(x+3)^2}$$

$$x=1 \rightarrow f'(1) = \frac{3m+7}{16} \xrightarrow{\text{با شیب خط داده شده برابر است}} \frac{3m+7}{16} = \frac{3}{4} \rightarrow m+2 = 3 \rightarrow m=1 \quad \checkmark$$

$$f(1) = \text{معادله خط معادله به ازای } x=1 \rightarrow 1 = \frac{m}{f} + \frac{n}{f} \rightarrow \frac{n}{f} = \frac{1}{f} \rightarrow n=1$$

$$m+n = 2 \quad \textcircled{2}$$

$$f(x) = \frac{yV - \sin^y x}{9 - \sin^y x}, \quad g(x) = \frac{x^y}{y + \sin x}, \quad \left(y g \left(\frac{dx}{y} \right) - f \left(\frac{dx}{y} \right) \right)' = ?$$

$$y g(x) - f(x) = \frac{y}{y + \sin x} - \frac{yV - \sin^y x}{9 - \sin^y x} = \frac{y(9 - \sin^y x) - yV + \sin^y x}{9 - \sin^y x}$$

$$= \frac{\sin^y x - 9 \sin x}{9 - \sin^y x} \xrightarrow[\text{fog}]{\text{chain rule}} \frac{(y x^{y-1} - 9)(9 - x^y) + y x (x^y - 9x)}{(9 - x^y)^2} \times \cos x$$

$$\frac{-x^y + 9x^{y-1} - 9}{-(9 - x^y)^2} \times \cos x = -\cos x \xrightarrow{x = \frac{dx}{y}} -\cos \left(\frac{R}{y} \right) = \boxed{-\frac{1}{y}}$$

$$f(x) = -\frac{1}{\sqrt{|x+1|}}, \quad g(x) = \frac{1}{x^\Delta + |x^\Delta|}, \quad (f \circ g(x))' = ?$$

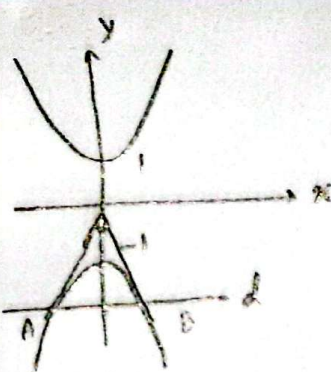
$$f \circ g(x) = \frac{-1}{\sqrt{\left| \frac{1}{x^\Delta + |x^\Delta|} + \left| \frac{1}{x^\Delta + |x^\Delta|} \right| \right|}} \xrightarrow{x > 0} -x \rightarrow f \circ g(x) = -x \xrightarrow{(\cdot)'} (f \circ g(x))' = \boxed{-1}$$

$$f(x) = \left(\frac{-1 + \sin x}{1 + \sin x} \right)^y, \quad f(x) = x g(x) + 1 \rightarrow g(x) = \frac{f(x) - 1}{x}, \quad \lim_{x \rightarrow 0} g(x) = ?$$

$$\lim_{x \rightarrow 0} \frac{f(x) - 1}{x} = \frac{0}{0} \xrightarrow{H} \lim_{x \rightarrow 0} \frac{f'(x)}{1} = f'(x) = f'(0)$$

$$f(x) = g \circ h(x) \rightarrow \begin{cases} h(x) = \sin x \\ g(x) = \left(\frac{x-1}{x+1} \right)^y \end{cases} \xrightarrow{(\cdot)'} y \times \frac{\sin x - 1}{\sin x + 1} \times \frac{y}{(\sin x + 1)^y} \times \cos x \xrightarrow{x=0}$$

$$f'(0) = y \times \frac{-1}{1} \times \frac{y}{1} \times 1 = \boxed{-y}$$



تابع ابعاد
شده

$$y = -x^2 - 1 \xrightarrow{(1)'} y' = -2x$$

$x=A \quad y' = -2A$
 $x=B \quad y' = -2B$

$$-2Ax + 2B = -1 \rightarrow A \times B = \frac{-1}{f} \textcircled{1}$$

$$y = -x^2 - 1 \xrightarrow{x=A, B} -A^2 - 1 = -B^2 - 1 \rightarrow A = \pm B \xrightarrow{\text{باتوجه به شکل}} A = -B \textcircled{2}$$

$$\textcircled{1}, \textcircled{2} \rightarrow B^2 = \frac{1}{f} \rightarrow B = \frac{1}{\sqrt{f}}, A = \frac{1}{\sqrt{f}}$$

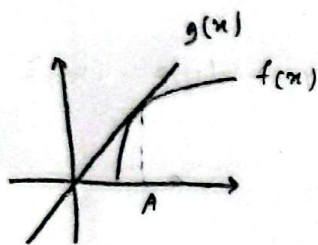
$$\rightarrow y = -x^2 - 1 \xrightarrow{x=\frac{1}{\sqrt{f}}} y = -\frac{1}{f} - 1 = \frac{-\delta}{f}$$

فاصله d از مبدأ:

(فاصله از مبدأ تا لام می گوییم)

$$\frac{-\delta}{f}$$

$$f(x) = \sqrt{x} \quad (fx^2 + 3), \quad \text{خط } g(x) = ax$$



$$f(x) = \sqrt{x} + 4x^{1/2} \xrightarrow{(1)'} f'(x) = \frac{1}{2}x^{-1/2} + 2x^{-1/2}$$

$$g(x) = ax$$

$$f(A) = g(A) \rightarrow \sqrt{A} + 4A^{1/2} = aA \xrightarrow{\div A} \sqrt{A} + 4A^{-1/2} = a \textcircled{1}$$

$$f'(A) = g'(A) \rightarrow \frac{1}{2}A^{-1/2} + 2A^{-1/2} = a$$

$$\rightarrow \frac{1}{2}A^{-1/2} + 2A^{-1/2} = \sqrt{A} + 4A^{-1/2} \rightarrow 12A^{-1/2} = 4A^{-1/2} \rightarrow 3A^{-1/2} = A^{-1/2}$$

$$\rightarrow 3 = 1 \rightarrow \text{Incorrect}$$

$$\textcircled{1} \quad \sqrt{A} + 4A^{-1/2} = a \rightarrow a = \sqrt{2}$$

$$\textcircled{2}$$

$$f(x) = \frac{\sqrt{x}}{-2x^r + x + 1}, \quad \frac{dy}{dx} = y = ax = g(x)$$

$$f(A) = g(A) \rightarrow \frac{A^{1/2}}{-2A^r + A + 1} = aA \rightarrow \frac{A^{-1/2}}{-2A^r + A + 1} = a \quad \textcircled{1}$$

$$f'(x) = \frac{\frac{1}{2}x^{-1/2}(-2x^r + x + 1) - (-2rx^{r-1} + 1)x^{1/2}}{(-2x^r + x + 1)^2} = \frac{rx^{r+1/2} + \frac{1}{2}x^{-1/2} - \frac{1}{2}x^{1/2}}{(-2x^r + x + 1)^2}$$

$$f'(A) = \frac{rA^{r+1/2} + \frac{1}{2}A^{-1/2} - \frac{1}{2}A^{1/2}}{(-2A^r + A + 1)^2} = a \quad \textcircled{1}$$

1,05

$$\rightarrow rA^{r+1/2} + \frac{1}{2}A^{-1/2} - \frac{1}{2}A^{1/2} = A^{-1/2}(-2A^r + A + 1)$$

$$\rightarrow rA^r + \frac{1}{2} - \frac{1}{2}A = -2A^r + A + 1 \rightarrow \Delta A^r - \frac{r}{2}A - \frac{1}{2} = 0$$

$$\rightarrow 1 \cdot A^r - \frac{r}{2}A - \frac{1}{2} = 0 \xrightarrow{\text{دس}} A^r - \frac{r}{2}A - \frac{1}{2} = 0 \rightarrow (A - \frac{1}{2})(A + \frac{r}{2}) = 0$$

$$\rightarrow A = \frac{1}{2}, \frac{1}{2} \xrightarrow{D_f} A = \frac{1}{2} \rightarrow A = r^{-1}$$

$$\textcircled{1} \frac{r^{1/2}}{-2 \times r^{-r} + r^{-1} + 1} = a \rightarrow \frac{\sqrt{r}}{\frac{1}{r} - \frac{1}{r} + 1} \rightarrow a = \sqrt{r}$$

$$f(x) = \frac{\sqrt{\frac{1}{r}}}{-r(\frac{1}{r})^r + \frac{1}{r} + 1} = \frac{\sqrt{r}}{r}$$

$$(f \circ g)'(\frac{\sqrt{\Delta}}{r}) = ? , f \circ g(x) = (g(x) \cdot [g(x)]^r)' \xrightarrow{(1)'} r(g(x) \cdot [g(x)]^r)' \times (g'(x) \cdot [g(x)] + 1)$$

$$g(\frac{\sqrt{\Delta}}{r}) = r^+, g(x) = \frac{1}{\sqrt{x^r - 1}} \xrightarrow{(1)'} \frac{-rx}{r\sqrt{x^r - 1} \times (x^r - 1)} \xrightarrow{x = \frac{\sqrt{\Delta}}{r}} \frac{-\frac{\sqrt{\Delta}}{r}}{\frac{1}{r} \times \frac{1}{r}} = -r\sqrt{\Delta} \quad \textcircled{2}$$

$$(f \circ g)'(\frac{\sqrt{\Delta}}{r}) \xrightarrow{(1)'} r \left(\frac{r \times r}{r} \right)' \times (-r\sqrt{\Delta} \times r) = -17 \times r \times r \times \sqrt{\Delta} \xrightarrow{\div -r\sqrt{\Delta}} \frac{-17 \times r \times r \times \sqrt{\Delta}}{-r \times \sqrt{\Delta}} = 17$$