بو یا زلفلیان   به نام خدا   ۱۹٫۵ آفرین

DATE / /   SUBJECT:

① $f(3)=5 \rightarrow m=\frac{5-1}{3-0}=\frac{4}{3} \rightarrow \boxed{f'(3)=\frac{4}{3}}$ ۲

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② $m=\frac{-1}{3} \rightarrow y=\frac{1}{3}x+\frac{4}{3} \rightarrow \frac{x+4}{3}=\sqrt{ax-1} \rightarrow ax-1=\frac{x^2+8x+16}{9} \rightarrow$

$x^2+8x-9ax+25=0 \rightarrow \Delta=0 \rightarrow (8-9a)^2=100 \rightarrow 8-9a=\pm 10 \rightarrow a=\frac{-2}{9}$, $\boxed{a=2}$

$f'(x)=\frac{1}{3} \rightarrow \frac{a}{2\sqrt{ax-1}}=\frac{1}{3} \rightarrow a>0 \rightarrow a=2 \rightarrow \frac{1}{\sqrt{2x-1}}=\frac{1}{3} \rightarrow 2x-1=9 \rightarrow x=5$

$f(x)=\sqrt{2x-1} \rightarrow f(5)=\sqrt{9}=\boxed{3}$ ۲

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③ $g'=\frac{(2x+m)(x+3)-(1)(x^2+mx+1)}{(x+3)^2}=\frac{2x^2+6x+mx+3m-x^2-mx-1}{(x+3)^2}=$

$\frac{x^2+6x+3m-1}{(x+3)^2} \rightarrow \frac{6+3m}{16}=\frac{3}{4} \rightarrow \boxed{m=2}$, $x=1 \rightarrow y=\frac{4}{4}=1$

$\rightarrow 4-3=\boxed{n=1} \rightarrow \boxed{m+n=3}$ ۲

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④ $f(x)=\frac{(3-\sin x)(9+3\sin x+\sin^2 x)}{(3-\sin x)(3+\sin x)}=\frac{9+3\sin x+\sin^2 x}{3+\sin x} \rightarrow \frac{9-9-3\sin x-\sin^2 x}{3+\sin x}=3g(x)-f(x)$

$=\frac{-3\sin x-\sin^2 x}{3+\sin x}=-\sin x \rightarrow 3g'(x)-f'(x)=-\cos x \rightarrow 3g'(\frac{\pi}{3})-f'(\frac{\pi}{3})=\boxed{\frac{-1}{2}}$ ۲

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⑤ $g'(x)\times f'(g(x))=(f\circ g(x))' \rightarrow f\circ g(x)$; $x=\sqrt[5]{3} \rightarrow x>0 \rightarrow |x|=x \rightarrow f\circ g(x)=\frac{-1}{\sqrt[5]{4x^5}}$ ۱٫۵

$=\frac{-1}{x\sqrt[5]{4}}=\frac{-1}{\sqrt[5]{4}}\times x^{-1} \rightarrow (f\circ g(x))'=\frac{1}{\sqrt[5]{4}}\times x^{-2}=\frac{1}{\sqrt[5]{4}}\times\frac{1}{\sqrt[5]{9}}=\frac{1}{\sqrt[5]{36}}=6^{-\frac{2}{5}}$

پویا ملکیان

DATE / / SUBJECT:

$f'(x) = g(x) + \underbrace{g'(x)x}_{x\to 0} \rightarrow 2\left(\frac{-1+\sin x}{1+\sin x}\right) \times \left(\frac{\cos x(1+\sin x) - \cos x(-1+\sin x)}{1+\sin x}\right) = g(0) \rightarrow$ (۶)

$2 \times (-1) \times \left(\frac{2}{1}\right) = \boxed{-4 = g(0) = \lim_{x\to 0} g(x)}$

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$y = -x^2 - 1$, $y = k$ $\rightarrow$ $\alpha + \beta = x_S = 0 \longrightarrow \alpha+\beta = 0$ (۷)

$y' = -2x \rightarrow -2\alpha = \frac{+1}{+2\beta} \rightarrow \alpha\beta = \frac{-1}{4}$ $\Big\} \Rightarrow \alpha = \frac{1}{2}, \beta = -\frac{1}{2} \rightarrow$

$y = -1{,}25 = k \rightarrow$

فاصله از مبدأ مختصات $= \boxed{|-1{,}25|}$

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$y = ax \rightarrow ax = 2\sqrt{x}(4x^2+3) \xrightarrow{x\neq 0} a\sqrt{x} = 8x^2 + 6 \rightarrow 20x^2 + 3 = 8x^2 + 6 \rightarrow$ (۸)

$a = 20x^{\frac{3}{2}} + \frac{6}{2\sqrt{x}}$ $\qquad 12x^2 = 3 \Rightarrow x = \pm\frac{1}{2} \rightarrow \boxed{x = \frac{1}{2}}$

$\rightarrow a_{\frac{1}{2}} = \frac{2}{\sqrt{2}} \times (4) \rightarrow \boxed{a = 8\sqrt{2}} =$ شیب خط

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$y = mx \rightarrow mx = \frac{\sqrt{x}}{-2x^2+x+1} \rightarrow \frac{\frac{1}{2}(-2x^2+x+1) - (-4x^2+x)}{(-2x^2+x+1)^2} = \frac{1}{-2x^2+x+1} \rightarrow$ (۹)

$m = \frac{\frac{1}{2\sqrt{x}}(-2x^2+x+1) - (-4x+1)(\sqrt{x})}{(-2x^2+x+1)^2}$

$-2x^2+x+1 = -x^2 + \frac{x}{2} + \frac{1}{2} + 4x^2 - x \rightarrow -2x^2+x+1 = 3x^2 - \frac{x}{2} + \frac{1}{2} \rightarrow 5x^2 - \frac{3}{2}x - \frac{1}{2} = 0$

$x = \frac{\frac{3}{2} \pm \sqrt{\frac{9}{4}+10}}{10} = \frac{\frac{3}{2} \pm \frac{7}{2}}{10} \xrightarrow{x>0} \boxed{x = \frac{1}{2}} \rightarrow f\left(\frac{1}{2}\right) = \frac{\frac{1}{\sqrt{2}}}{1} = \frac{1}{\sqrt{2}} = \frac{m}{2} \rightarrow$

$m = \sqrt{2} \rightarrow$ A شیب OA $= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

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رویا نقلیان

$(f\circ g(x))' = f'(g(x)) \times g'(x) = f'(۲) \times g'(\frac{\sqrt{۵}}{۲}) = ۲۴ \times \cancel{۴}^{۲} \times \frac{-\sqrt{۵}}{\cancel{۲}} (\frac{۱}{۴})^{-\frac{۳}{۲}} = ۴۸ \times (-\sqrt{۵}) \times ۸ \rightarrow$ ۱۰

$$\frac{۸ \times ۴۸ \times (-\sqrt{۵})}{-۴۸\sqrt{۵}} = \boxed{۸}$$

$$g'(x) = \frac{-۱}{۲}(x^۲-۱)^{-\frac{۳}{۲}} \times ۲x = -x(x^۲-۱)^{-\frac{۳}{۲}}$$

$$x < \frac{\sqrt{۵}}{۲} \rightarrow x^۲ < \frac{۵}{۴} \rightarrow x^۲-۱ < \frac{۱}{۴} \rightarrow \frac{۱}{x^۲-۱} > ۴ \rightarrow \frac{۱}{\sqrt{x^۲-۱}} > ۲ \rightarrow \left[\frac{۱}{\sqrt{x^۲-۱}}\right] = ۲$$

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

$x>۰ \longrightarrow g(x) = \frac{۱}{۲x^۵} \longrightarrow f(x) = \frac{-۱}{\sqrt[۵]{۲x}} \rightsquigarrow f\circ g(x) = \frac{-۱}{\sqrt[۵]{۲(\frac{۱}{۲x^۵})}}$

$f\circ g(x) = -x \longrightarrow f\circ g'(x) = \boxed{-۱} \rightsquigarrow f\circ g'(\sqrt[۵]{۳}) = ۱$