نام و نام خانوادگی ..[illegible].. پاسخنامه تشریحی تکلیف شماره ..۲۴.. کلاس ..[illegible] دوازدهم A..

۱

خط مماس $g(x)=ax+b \xrightarrow{x=3} 3a+1=5 \to a=\frac{4}{3}$ و $g'(x)=f'(x)=\frac{4}{3} \to$

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

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$a=\frac{1-2}{-1-2}=\frac{1}{3} \Rightarrow d: y=\frac{1}{3}x+\frac{4}{3}$ $\quad d=f(x) \to \frac{1}{3}x+\frac{4}{3}=\sqrt{ax-1}$

$\to ax-1=\frac{x^2}{9}+\frac{8x}{9}+\frac{16}{9} \to x^2+(8-9a)x+25=0$ نقطه تماس $\Rightarrow \Delta=0$

$\to (8-9a)^2=100 \to 8-9a=\pm 10$

$\to a=-\frac{2}{9} \to f(5)=\sqrt{\frac{-19}{9}}$ غ ق ق

$\to a=2 \to f(5)=\sqrt{9}=3$ ✓

۳

$y_1=y_2 \xrightarrow{x=1} \frac{3+n}{4}=\frac{2+m}{4} \Rightarrow m=n+1$ $\quad y=\frac{3}{4}x+\frac{n}{4}$

$y_1'=y_2' \to \frac{(2x+m)(x+3)-(x^2+mx+1)}{(x+3)^2}=\frac{3}{4} \Rightarrow 2m=4 \to m=2$

و $n=m-1 \to n=1$ $\quad m+n=3$

۴

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

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

$(3g(x)-f(x))'=-\cos x \xrightarrow{x=\frac{5\pi}{3}} -\cos\left(\frac{5\pi}{3}\right)=-\frac{1}{2}$

۵

$g'(x)f'(g(x))=(fog(x))'$ و $\sqrt[5]{3}>0 \to |x|=x \to fog(x)=-\frac{1}{\sqrt[5]{29}}=-x$

$\to (fog(x))'=-1$

$f(x)=xg(x)+1 \to g(x)=\frac{f(x)-1}{x}$ $\quad \lim_{x\to 0} g(x)=\lim_{x\to 0}\frac{f(x)-1}{x}=\frac{0}{0}$

<u>hop</u> → $\lim_{x\to 0} f'(x)=\lim_{x\to 0} 2\left(\frac{\sin x-1}{\sin x+1}\right)\left(\frac{2\cos x}{(1+\sin x)^2}\right)=-2\times 2\times 1=-4$ ۶

قرینه نسبت به محور xها : $y=-x^2-1$ ⟹ شیب خط‌ها دارای عمود $y'=-2x$

$-2x\times 2x=-1\to 4x^2=1\to x=\pm 1/2$ $\quad \begin{cases}(-1/2\ ,\ -5/4)\\(1/2\ ,\ -5/4)\end{cases} \Rightarrow y=-\frac{5}{4}$ ۷

فاصله از مبدا خط $=|d|=\left|-\frac{5}{4}\right|=5/4$

$d: ax+\overset{0}{b} \to d=f(x)\ ,\ d'=f'(x) \Rightarrow dx=f(x)\,x \to$

$ax=\frac{x}{\sqrt{x}}(4x^2+3)+16x^2\sqrt{x} \to 2\sqrt{x}(4x^2+3)+16x^2\sqrt{x} \to$

$4x^2-16x^2+3 \to 12x^2=3 \to x=\pm 1/2\ ,\ D_f:[0,+\infty) \Rightarrow x=+1/2$ ۸

$f(1/2)=2\sqrt{1/2}\left(4\times\frac{1}{4}+3\right)=4\sqrt{2}$ $\quad y=mx \to m=\frac{y}{x}\to m=\frac{4\sqrt{2}}{1/2}=8\sqrt{2}$

$x=A \to Aa=\frac{\sqrt{A}}{-2A^2+A+1} \to a=\left(\frac{1}{2\sqrt{A}}(-2A^2+A+1)-\sqrt{A}(-4A+1)\right)\times$

$\frac{1}{(-2A^2+A+1)^2}=\frac{-2A^2+A+1+8A^2-2A}{2\sqrt{A}}\times\frac{1}{(-2A^2+A)^2} \to \frac{\sqrt{A}}{A}=\frac{6A^2-A+1}{2\sqrt{A}(-2A^2+A+1)}$ ۹

$\to 10A^3-3A^2-A=0$ $\begin{cases}A_1=0 & \text{غ ق ق}\\ A_2=-1/5 & \text{غ ق ق}\\ A_3=1/2 & \checkmark\end{cases}$

$f\circ g'(x)=y'=g'(x)\times f'(g(x)) \xrightarrow{x=\frac{\sqrt{5}}{2}} y'\left(\frac{\sqrt{5}}{2}\right)=g'\left(\frac{\sqrt{5}}{2}\right)\times f'\left(g\frac{\sqrt{5}}{2}\right)$

$g\left(\frac{\sqrt{5}}{2}\right)=2^+ \to y'\left(\frac{\sqrt{5}}{2}\right)=g'\left(\frac{\sqrt{5}}{2}\right)\times f'_+(2)$ $\quad f(x)=(2x)^3 \to f'(x)=24x^2$ ۱۰

$f'_+(2)=96$ $\quad g'(x)=-\frac{1}{2}\times 2x(x^2-1)^{-3/2} \to g'\left(\frac{\sqrt{5}}{2}\right)=-4\sqrt{5}$

$y'_+\left(\frac{\sqrt{5}}{2}\right)=-4\sqrt{5}\times 96=8\times -48\sqrt{5}$ $\quad \frac{8\times -48\sqrt{5}}{-48\sqrt{5}}=8$