Date hw: ۲۷ علی ساعی Subject ۱۹,۱۵

$f(0)=0 \Rightarrow 1+b=0 \Rightarrow \boxed{b=-1}$ (۱)

$f'(x)=-4\sin 2x\alpha \cos^2 2x+2ax$ همراز $\Rightarrow$

$\lim_{x\to 0}\frac{f(x)}{x}=\lim \frac{-12x(1-2x^2)+2ax}{x}$ (۲)

$\lim_{x\to 0} -12+24x^2+2a=2 \Rightarrow \boxed{a=7}$

$\boxed{a+b=6}$ ✓

$m_1=\frac{-1}{m_2} \Rightarrow f'(x_1)=2x$ (۲)

$\hookrightarrow 2x_1=\frac{-1}{2x_2}$ (۲)

$|x_1|=|x_2|$ $\Big\}$ $4x^2=1$

$x^2=\frac{1}{4}$

$x=\pm\frac{1}{2}$

$f(\frac{1}{2})=f(-\frac{1}{2})=\boxed{\frac{-3}{4}}$

$-\frac{3}{4}+-\frac{3}{4}=\boxed{\frac{-3}{2}}$ ✓

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(۲)

$y = mx + b \Rightarrow m = \frac{\Delta y}{\Delta x} = 4 \Rightarrow y = 4x + b$

$b = -9 \Rightarrow y = 4x - 9$

$m = f'(x) \Rightarrow \frac{a}{2x(x-1)} = 4x - 9$

(۲)

$a = 2(2x-3)(2x-1) \Rightarrow \frac{a}{3} = 4x^2 - 8x + 3$

$\Rightarrow 4x^2 - 8x + 3 - \frac{a}{3} = 0 \Rightarrow \Delta = 0 \Rightarrow 64 - 16(3 - \frac{a}{3})$

$\Rightarrow 64 - 48 + 16\frac{a}{3} = 0 \Rightarrow 16\frac{a}{3} = -16 \Rightarrow \frac{a}{3} = -1$

$\boxed{a = -3}$ ✓ $\boxed{f(\omega) = \frac{3}{9} = \frac{1}{3}}$

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(۴)

$f(1) = \frac{a+1}{a+1} = 1 \Rightarrow 2 + b = 1$

$\boxed{b = -1}$

(۳)

$f'(x) = \frac{1 - a^2}{(ax+1)^2} \Rightarrow f'(1) = \frac{1-a^2}{(a+1)^2} = 2 \Rightarrow \frac{1-a}{1+a} = 2$

$\Rightarrow 1 - a = 2 + 2a \Rightarrow 3a = -1 \Rightarrow \boxed{a = -\frac{1}{3}}$ ✓

$a - b = -\frac{1}{3} + 1 = \boxed{\frac{2}{3}}$

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(۵)

$\sin x + \frac{1}{2}\cos x = \frac{\sqrt{2}}{2}\sin x \Rightarrow \frac{1}{2}\cos x = \frac{\sqrt{2}-1}{2}\sin x$

$\boxed{x = \frac{\pi}{4}}$ $f'(x) = \cos x - \frac{1}{2}\sin x \Rightarrow f'(\frac{\pi}{4}) = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{4}$

$= \frac{\sqrt{2}}{4} \Rightarrow f(\frac{\pi}{4}) = \frac{3\sqrt{2}}{4} \Rightarrow y - \frac{3\sqrt{2}}{4} = \frac{\sqrt{2}}{4}(x - \frac{\pi}{4})$ (۱/۵)

$y = \frac{\sqrt{2}}{4}x - \frac{\sqrt{2}\pi}{16} + \frac{3\sqrt{2}}{4} = \frac{\sqrt{2}}{4}x - \frac{\sqrt{2}\pi}{16} + \frac{12\sqrt{2}}{16} \Rightarrow$

$\boxed{\text{عرض از مبدا} = \frac{(12-\pi)\sqrt{2}}{16}}$

$y - \frac{3\sqrt{2}}{4} = \frac{\sqrt{2}}{4}(x - \frac{\pi}{4}) \xrightarrow{y=0} -\frac{3\sqrt{2}}{4} = \frac{\sqrt{2}}{4}(x - \frac{\pi}{4}) \rightarrow x = \frac{\pi}{4} - 3$

$f'(x) = 4x^2 - 4x - 12$ (۴)

$\Rightarrow A\left|\begin{matrix}-1\\ \wedge\end{matrix}\right.$ $B\left|\begin{matrix}۳\\ -۱۹\end{matrix}\right.$ $\Rightarrow m = \frac{-۲۷}{۳} = -۹$ (۲)

$f'(x) = -۹ \Rightarrow 4x^2 - 4x - 12 = -9$ ✓

$4x^2 - 4x - ۳ = ۰ \Rightarrow \Delta > ۰ \Rightarrow$ دو نقطه

$f'(x) = ۳kx^2 + ۲(k+1)x \Rightarrow f''(x) = ۶kx + ۲(k+1)$ (۷)

$\Rightarrow ۶kx + ۲k + ۲ = ۰ \Rightarrow x = \frac{-k-1}{۳k} < ۰ \Rightarrow \begin{cases} k > ۰ \\ k < -۱ \end{cases}$ (۱)

$f(\text{طول}) > ۰ \Rightarrow k\left(\frac{-k-1}{۳k}\right)^۳ + (k+1)\left(\frac{-k-1}{۳k}\right)^۲ \Rightarrow$

$-\frac{(k+1)^۳}{۲۷k^۲} + \frac{(k+1)^۳}{۹k^۲} > ۰ \Rightarrow \underbrace{\frac{۲(k+1)^۳}{۲۷k^۲}}_{+} > ۰ \Rightarrow (k+1)^۳ > ۰$ (۲)

$k+1 > ۰ \Rightarrow k > -۱$ (۲) $\Rightarrow$ (۱) $\wedge$ (۲) $\rightarrow k > ۰$

$\Rightarrow$ همه‌ی kهای مثبت ✓

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$A\left|\begin{matrix}-1\\-4\end{matrix}\right.$ ⇒ عطف

(۱)

$f''(x)=6x+2a \Rightarrow f''(-1)=0 \Rightarrow -6+2a=0$ (۲)

$\boxed{a=3}$ $9\ f(-1)=-4 \Rightarrow -1+3-b-1=-4$

$\boxed{b=3} \Rightarrow \boxed{\frac{a}{b}=\frac{3}{3}}$ ✓

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(۹)

$f'(0)=0 \Rightarrow \boxed{b=0}$

$f(0)=4 \Rightarrow \boxed{c=4}$

$f'(x)=3x^2+2ax \Rightarrow 0 \Rightarrow x(3x+2a)=0$ (۲)

$\Rightarrow \begin{cases} x=0 \\ x=\frac{-2a}{3} \end{cases} \Rightarrow \min$ نسبی $\Rightarrow f(\frac{-2a}{3})=0 \Rightarrow$

$\frac{-8a^3}{27}+\frac{4a^3}{9}+4=0 \Rightarrow \frac{4a^3}{27}=-4 \Rightarrow a^3=-27$

$\boxed{a=-3}$ $x_{min}=\frac{-2a}{3}=\boxed{2}$ ✓

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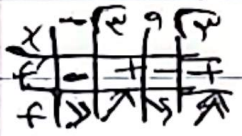
(۱۰)

$f'(x)=4x^3-12x=4x(x^2-3)=0 \Rightarrow \begin{cases} x=0 \\ x=\pm\sqrt{3} \end{cases}$ (۲)



$\Rightarrow .min=A\left|\begin{matrix}-\sqrt{3}\\-9\end{matrix}\right.$ $B\left|\begin{matrix}\sqrt{3}\\-9\end{matrix}\right.$ $m_{AB}=0$

$f''(x)=12x^2-12=0 \Rightarrow x=\pm 1 \Rightarrow C\left|\begin{matrix}-1\\0\end{matrix}\right.$ $D\left|\begin{matrix}1\\0\end{matrix}\right.$

$m_{CD}=0 \Rightarrow$ زاویه صفر درجه ✓