تکلیف ۲۲

۲۳ دوشنبه

14 Oct 2024

۱۴۴۶ ربیع الثانی ۱۰

۱) $A\left|\begin{matrix}0\\1\end{matrix}\right.$, $B\left|\begin{matrix}3\\a\end{matrix}\right.$ $\Rightarrow m_{AB}=\frac{a-1}{3}=\frac{4}{3}=f'(3)$

۲) $A\left|\begin{matrix}-1\\0\end{matrix}\right.$ $\Rightarrow m_{AB}=\frac{1}{3}$, $B\left|\begin{matrix}2\\b\end{matrix}\right.$

$\sqrt{9m-1}=\frac{1}{3}m+\frac{4}{3}\rightarrow 3\sqrt{9m-1}=m+4$

$\Delta=0 \leftarrow m^2+(18-9a)m+2a=0$

$b=18-9a$

$-b$

$a=-\frac{2}{9}$ یا $a=2$

$f(m)=\sqrt{2m-1}\Rightarrow f(a)=3$

$y=\frac{1}{3}m+\frac{4}{3}$

۳) $y=\frac{2m^2+mn+1}{m+2}\rightarrow y'=\frac{(4+m)2^2-(1+m+1)}{4^2}=\frac{3}{4}$

شیب

$4y-3m=b$

$4(m+2)=2-m=12\rightarrow m=2$

$A\left|\begin{matrix}1\\1\end{matrix}\right.$

$y=\frac{m^2+2m+1}{m+3}\xrightarrow{m=1}\frac{1+2+1}{1+3}=1$

$1=\frac{3}{4}+\frac{b}{4}\rightarrow b=1$

$m+2=3\in$ بازه

۴) $g(m)=\frac{3}{3+\sin m}\rightarrow g'(m)=\frac{-3\cos m}{(3+\sin m)^2}\xrightarrow{g'(\frac{3\pi}{3})}=\frac{-3}{\frac{2}{(4-\sqrt{3})^2}}=\frac{-6}{(4-\sqrt{3})^2}$

$f(m)=\frac{2-\sin^3 m}{2\sin^2 m}=\frac{\sin^2 m+2\sin m+9}{3+\sin m}\rightarrow f'(m)$

$m=\frac{3\pi}{3}$

$3g'(\frac{3\pi}{3})-f'(\frac{3\pi}{3})=\frac{1+2\sqrt{3}}{3}\Leftarrow\frac{-3\sqrt{3}}{2}-\frac{-3\sqrt{3}}{(4-\sqrt{3})^2}$

۵) $g'(m)\cdot f'(g(m))=(fog)'(m)$, $g(m)=\frac{1}{3m^2}$, $m>0$

$f(m)=\frac{-1}{2\sqrt{2m}}$

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$(fog)'(m)=f'(\frac{1}{3m^2})=-m\Rightarrow$ منفی $\Leftarrow -1$

(۶)

$$g(x) = \frac{f(x)-1}{x} = \frac{1+\sin^2-2\sin-1-\sin^2-2\sin}{(1+\sin^2+2\sin)x}$$

$$\Rightarrow \lim_{x\to 0} \frac{-4\sin x}{(1+\sin^2+2\sin x)x} \longrightarrow \sin x \sim x$$

$$\star \longrightarrow \lim_{x\to 0} \frac{-4x}{(1+x^2+2x)x} = \boxed{-4}$$

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(۷)

$$f(x) = -x^2-1 \xrightarrow{f'(x)} -2x \qquad f'(z)\times f'(-z) = -1$$

$$f(z) = f(-z) = -z^2-1 = \frac{-5}{4} \longrightarrow y = -\frac{5}{4}$$

$$\boxed{1/25} = \left|-\frac{5}{4}\right| \text{فاصله}$$

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(۸)

$$f(x) = 2\sqrt{x}\,(4x^2+3) = \ldots = 8x^{\frac{5}{2}} + 6x^{\frac{1}{2}}$$

$$f'(x) = 20x^{\frac{3}{2}} + 3x^{-\frac{1}{2}} \longrightarrow 12x^{\frac{5}{2}} - 3x^{\frac{1}{2}} = 0$$

$$\longrightarrow 3\sqrt{x}\,(4x^2-1) = 0$$

$$\checkmark\ x = 0, \quad x = \pm\frac{1}{2}$$

$$m = 20\times\left(\frac{1}{2}\right)^{\frac{3}{2}} + 3\times\left(\frac{1}{2}\right)^{-\frac{1}{2}} = \boxed{8\sqrt{2}}\ \star$$

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(۹)

$$\sqrt{x} = t$$

$$\Downarrow\ f(x) = \frac{t}{-2t^4+t^2+1} = 9t^2 \xrightarrow{\text{مشتق}} -9(10t^4-3t^2-1) = 0$$

$$t^2 = -\frac{1}{5}\ \text{غ ق ق}, \qquad t^2 = \frac{1}{2}$$

$$\star\ f\left(\frac{1}{2}\right) = \frac{1}{\sqrt{2}} \div \left[-2\left(\frac{1}{4}\right)+\frac{3}{2}\right] = \boxed{\frac{1}{\sqrt{2}}} \Leftarrow \text{برابر}$$

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(۱۰)

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

$$g(x) = (x^2-1)^{-\frac{1}{2}} \longrightarrow g'(x) = -\frac{1}{2}(x^2-1)^{-\frac{3}{2}}\times 2x = -4\sqrt{5}$$

$$x \to 2^+ \to [\ ] \Rightarrow 2 \qquad f(x) = f(2x)^3 = 8x^3\ \star\ \boxed{\text{۸ برابر}}$$

$$f'\left(g\left(\tfrac{\sqrt{5}}{2}^-\right)\right)\times g'\left(\tfrac{\sqrt{5}}{2}\right) = -82-4\sqrt{5}\ \star \qquad f(x) = f'(24) = \ldots\ \star\star\star$$