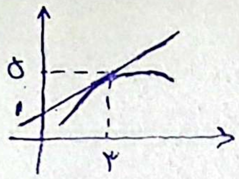
آرمین نوری

۱)



$$m=\frac{\Delta y}{\Delta x}=\frac{5-1}{3}=\frac{4}{3}$$

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۲)

$$\frac{a}{2\sqrt{ax-1}}=\frac{1}{3}\rightarrow 3a=2\sqrt{ax-1}\longrightarrow 9a^2=4(ax-1),\quad \sqrt{ax-1}=\frac{3a}{2}$$

$$y=\frac{1}{3}x+\frac{4}{3}=\underbrace{\sqrt{ax-1}}_{\frac{3a}{2}}\longrightarrow x=\frac{9a-8}{2}\qquad \rightarrow 9a^2=18a^2-16a-4$$

$$9a^2-16a-4=0\ \begin{cases}\rightarrow a=2\ \checkmark\\ \rightarrow a=-\frac{2}{9}\ \times\end{cases}\qquad f(5)=\sqrt{9}=3$$

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۳)

$$y=\frac{3}{4}x+\frac{n}{4}\xrightarrow{x=1}y=\frac{3+n}{4}\rightarrow\left|\begin{matrix}1\\ \frac{3+n}{4}\end{matrix}\right.$$

$$y=\frac{x^2+mx+1}{x+3}\xrightarrow{x=1}y=\frac{m+2}{4}\rightarrow\left|\begin{matrix}1\\ \frac{m+2}{4}\end{matrix}\right.$$

$$\rightarrow m+2=3+n\qquad m-n=1\rightarrow n=1$$

$$\frac{(2x+m)(x+3)-(x^2+mx+1)}{(x+3)^2}=\frac{3}{4}\longrightarrow\frac{x^2+6x+3m-1}{(x+3)^2}=\frac{3}{4}$$

$$\frac{6+3m}{16}=\frac{3}{4}\rightarrow 2+m=4\rightarrow m=2\qquad m+n=3$$

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۴)

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

$$=\frac{-\sin^2x-3\sin x}{3+\sin x}=\frac{-\sin x(\sin x+3)}{3+\sin x}=-\sin x\xrightarrow{\text{مشتق}}-\cos x\xrightarrow{x=\frac{5\pi}{3}}-\cos\frac{5\pi}{3}=-\frac{1}{2}$$

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۵)

$$g(x)=\frac{1}{2x^5}\qquad f(x)=\frac{-1}{\sqrt[5]{2x}}$$

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

$$f(g(x))=\frac{-1}{\sqrt[5]{2\times\frac{1}{2x^5}}}=\frac{-1}{\sqrt[5]{\frac{1}{x^5}}}=-x\xrightarrow{\text{مشتق}}-1$$

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۶)

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

$$\xrightarrow{Hop} 2\left(\frac{\sin x-1}{\sin x+1}\right)\left(\frac{\cos x(\sin x+1)-\cos x(\sin x-1)}{(\sin x+1)^2}\right)$$

$$=-2\left(\frac{2\cos x}{(\sin x+1)^2}\right)=\frac{-4}{1}=-4$$

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۷)

$$y=x^2+1 \xrightarrow{\text{قرینه نسبت به } x} y=-x^2-1 \qquad y'=-2x \qquad \begin{vmatrix}\alpha\\ -\alpha^2-1\end{vmatrix} \quad \begin{vmatrix}-\alpha\\ -\alpha^2-1\end{vmatrix}$$

$$-2\alpha\cdot 2\alpha=-4\alpha^2=-1 \qquad \alpha^2=\frac{1}{4} \qquad \alpha=\pm\frac{1}{2} \qquad \begin{vmatrix}\frac{1}{2}\\ -\frac{5}{4}\end{vmatrix} \quad \begin{vmatrix}-\frac{1}{2}\\ -\frac{5}{4}\end{vmatrix}$$

فاصله $=\frac{5}{4}$

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۸)

$y=ax \rightarrow d$ خط $\qquad 2\sqrt{B}\,(4B^2+3)=aB$ ①

$$\begin{vmatrix}B\\ aB\end{vmatrix} \qquad \frac{1}{\sqrt{x}}(4x^2+3)+8x(2\sqrt{x})=\frac{4x^2+3}{\sqrt{x}}+16x\sqrt{x}=a$$

$$\frac{4B^2+3}{\sqrt{B}}+16B\sqrt{B}=a \qquad \frac{aB}{2\sqrt{B}\times\sqrt{B}}+16B\sqrt{B}=a \qquad 16B\sqrt{B}=\frac{a}{2}$$

$$a=32B\sqrt{B} \qquad \cancel{2\sqrt{B}}(4B^2+3)=\cancel{32}^{16}B^2\cancel{\sqrt{B}} \qquad 4B^2+3=16B^2$$

$$12B^2=3 \qquad B^2=\frac{1}{4} \qquad B=\frac{1}{2} \qquad a=\frac{16}{\sqrt{2}}$$

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۹)

$$f'(x)=\frac{\frac{6x^2-x+1}{2\sqrt{x}}}{\left((x+\frac{1}{2})(x-1)\right)^2}=\frac{6x^2-x+1}{2\sqrt{x}\left((x+\frac{1}{2})(x-1)\right)^2} \qquad y=ax \qquad \frac{\sqrt{x}}{-2x^2+x+1}=ax$$

$$\frac{\sqrt{x}}{-2x^2+x+1}=x\times\frac{6x^2-x+1}{2\sqrt{x}\left((x+\frac{1}{2})(x-1)\right)^2} \rightarrow 6x^2-x+1=-4x^2+2x+2 \qquad 10x^2-3x-1=0 \quad x\begin{cases}\frac{1}{2}\ \checkmark\\ -\frac{1}{5}\end{cases}$$

$$A\left(\frac{1}{2},\frac{\sqrt{2}}{2}\right) \qquad \text{جواب}=\frac{\sqrt{2}}{2}$$

منفی زیر رادیکال $\ominus$

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۱۰)

$$fog \rightarrow \left(\frac{1}{\sqrt{x^2-1}}\left[\frac{1}{\frac{1}{\cancel{10}}}\right]\right)^3=\left(\frac{2}{\sqrt{x^2-1}}\right)^3 \rightarrow 3\left(\frac{2}{\sqrt{x^2-1}}\right)^2\left(-2x(x^2-1)^{-\frac{3}{2}}\right)$$

$$\frac{\cancel{3}(\cancel{16})(-8\sqrt{5})}{-\cancel{48}\sqrt{5}}=8$$