آرین کریمی　　　　شماره ۲۷

$\lim_{x\to 0} \frac{f(x)}{x} \overset{\frac{0}{0}}{\Rightarrow} -(6)(\cos^2 2x)(\sin 2x) + 2ax = 0 \rightarrow 1+b=0 \rightarrow b=-1$ ۱-

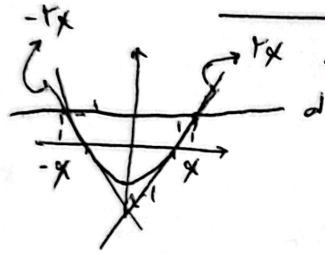
رفع ابهام HOP

$f'(x) = -6\sin 2x \cos^2 2x \;,\; f''(x) = 24\cos 2x \sin^2 2x - 12\cos^3 2x + 2a$

$\lim_{x\to 0} \frac{f'(x)}{x} \overset{\frac{0}{0}}{\Rightarrow} f''(x) = 2 \Rightarrow -12\cos^3 0 + 2a = 2 \Rightarrow a = 7$

رفع ابهام Hop

$a+b = 6$



$\rightarrow \cancel{2x \quad x + 2x \Rightarrow 1}$ ۲-

$4x^2 = 1 \rightarrow x = \pm\frac{1}{2} \;,\; y = (\frac{1}{2})^2 - 1 = -\frac{3}{4} \rightarrow -\frac{3}{4}\times 2 = -\frac{3}{2}$

$\frac{6-(-12)}{2.5-(-0.5)} = \frac{18}{3} = 6 \rightarrow m = 6 \rightarrow 6x - \cancel{9x} \rightarrow f(x) = 6x - 9$ ۳-

$f'(x) = 6 \rightarrow \frac{-2a}{4x^2-4x+1} = 6 \qquad \begin{cases} x = 1 \\ a = -3 \end{cases}$

$f(0) = \frac{-3}{10-1} = -\frac{1}{3}$

$y' = \frac{\cancel{ax}+1-\cancel{ax}-a^2}{(ax+1)^2} \xrightarrow{x=1} \frac{\cancel{1-a^2}\;(1+a)(1-a)}{(a+1)^2} = 2 \rightarrow \cancel{2a}+\cancel{2} = \cancel{2}-a \;(3a,\,-1) \Rightarrow a = -\frac{1}{3}$ ۴-

$y = \frac{x-\frac{1}{3}}{-\frac{1}{3}x+1} \xrightarrow{x=1} \frac{\frac{2}{3}}{\frac{2}{3}} = 1 \;,\; 2+b = 1 \rightarrow b = -1 \qquad -\frac{1}{3}-(-1) = \frac{2}{3}$

$\cancel{\sin x} + \frac{1}{2}\cos x = \frac{3}{2}\sin x \Rightarrow \sin x = \cos x \Rightarrow x = \frac{\pi}{4}$ ۵-

$\frac{1}{2}\sin x$

$f'(x) = \cos x - \frac{1}{2}\sin x \xrightarrow{x=\frac{\pi}{4}} \frac{\sqrt{2}}{2} - \frac{1}{2}\times\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{4} = m \;,\; (\frac{\pi}{4}, \frac{3\sqrt{2}}{4}) \rightarrow \frac{\sqrt{2}}{4}x + \frac{3\sqrt{2}}{4} - \frac{\sqrt{2}\pi}{16}$

$\frac{\sqrt{2}}{4}x = (\frac{\sqrt{2}\pi}{16} - \frac{3\sqrt{2}}{4})\frac{4}{\sqrt{2}} \Rightarrow x = \frac{\pi}{4} - 3$

$f(x) = 2x^3 - 3x^2 - 12x + 1$, $f'(x) = 6x^2 - 6x - 12 \to 6(x^2 - x - 2)$ —6

$(x-2)(x+1) \to$ $\begin{array}{ccc} & -1 & 2 \\ + & - & + \end{array}$

$\to A(-1, 8)$, $B(2, -19)$

$m_{AB} = \frac{8+19}{-1-2} = \frac{27}{-3} = -9 \Rightarrow f'(x) = -9$

$6(x-2)(x+1) = -9 \Rightarrow 6x^2 - 6x - 3 = 0 \Rightarrow \Delta > 0 \Rightarrow$ ۲ نقطه

$y'' = 6kx + 2k + 2$ —7

$\begin{cases} x \geq 0 \\ y'' = 0 \to 2k(3x+1) = -2 \to x = -\frac{1+k}{3k} \to x \geq 0 \quad \hookrightarrow \frac{1+k}{3k} \geq 0 \to \begin{array}{ccc} -1 & & 0 \\ - & + & - \end{array} \\ y > 0 \to \underbrace{x^2}_{\text{همیشه مثبت}} \underbrace{(kx + k + 1)} > 0 \end{cases}$

$x = -\frac{1+k}{3k} \to -\frac{1+k}{3} + k + 1 \to \frac{2k+2}{3} > 0 \to$ $\begin{array}{cc} -1 & \\ - & + \end{array}$

اشتراک بازه‌ها تهی است، پس جوابی برای k وجود ندارد که منفی و صحیح باشد!

$y' = 3x^2 + 2ax + b \to x, y \Rightarrow y'' = 6x + 2a = 0 \to \underbrace{x = -1}_{\text{نقطه عطف}} \Rightarrow a = 3$ —8

$-1 + a - b - 1 = -4 \Rightarrow \cancel{a}_{3} - b = -2 \to b = 5 \Rightarrow \frac{a}{b} = \frac{3}{5}$

$f'(x) = 3x^2 + 2ax + b \xrightarrow[f(0)=0]{x=0} b = 0 \Rightarrow f(x) = x^3 + ax^2 + 4$ —9

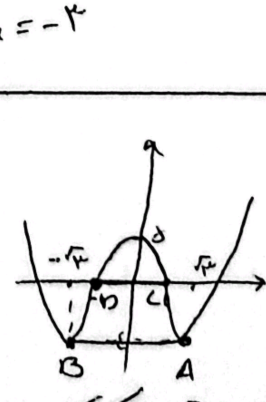
$f'(x) = 3x^2 + 2ax = 0 \to x = \frac{-2a \pm \sqrt{4a^2}}{6} = 0 , \frac{-4a}{6} = -\frac{2a}{3} \Rightarrow (-\frac{2a}{3}, 0) \to \frac{-2 \cdot \cancel{a}^{-3}}{3} = 2$

$f(-\frac{2a}{3}) = -\frac{8a^3}{27} + \frac{4a^3}{9} + 4 = 0$

$\frac{12a^3}{27}$ $\quad \frac{4a^3}{27} = -4 \to a^3 = -27 \Rightarrow a = -3$

$f'(x) = 4x^3 - 12x$ و $f''(x) = 12x^2 - 12$ —10

$-\sqrt{3}$ min B , 0 max , $\sqrt{3}$ min A ; $+1$ D , -1 C



$\underbrace{f(\sqrt{3}) = f(-\sqrt{3})}_{m_{AB} =} = -4$ و $f(+1) = f(-1) = 0$

دو پاره‌خط موازی هستند و با یکدیگر زاویه‌ای نمی‌سازند.