بهرام ستاری - دوازدهم تجربی B　　　به نام خدا　　　تألیف شماره ۲۷

۱۹/۵ آفرین

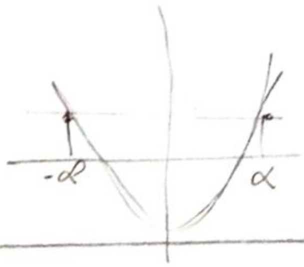
۱) ۱/۵

$\lim_{x\to 0}\frac{f(x)-f(0)}{x-0}=0 \to b=0$

$f'(x)=3\times 2\times \cos^2(2x)\times(-\sin 2x)+2ax \to f(0)=0 \to f'(0)=0$

$\lim_{x\to 0}\frac{f'(x)-f'(0)}{x-0}=2 \to f''(0)=2 \to a=1 \to a+b=1$

۲) ۲



$f'(x)\times f'(-x)=-1,\ f(x)=x^2+1 \to f'(x)=2x$

$-4\alpha^2=-1 \to \alpha=\pm\frac{1}{2} \ /\ f(\alpha)=\pm\frac{1}{2} \to \frac{1}{4}-1=\frac{-3}{4}$ ~~$\times 2=-\frac{3}{2}$~~

۳) ۲

$m=\frac{9-(-12)}{2.5-(-0.5)}=9 \to y-9=9(x-2.5)\ \ y=9x-9=\frac{a}{2x-1} \to 12x^2-24x+9-a=0$

$\Delta=0 \to (-24)^2-4(12)(9-a)=0 \to 48a=-144 \to a=-3 \to f(a)=-\frac{1}{3}$

۴) ۲

$2x+b=\frac{x+a}{ax+1}$ ، $\frac{(ax+1)-a(x+a)}{(ax+1)^2}=2 \to \frac{1-a^2}{(a+1)^2}=2 \to a$ → 1 ، $-\frac{1}{3}$

$y=\frac{x-\frac{1}{3}}{-\frac{1}{3}x+1} \to y=1 \to 2+b=1 \to b=-1 \to a-b=-\frac{1}{3}+1=\frac{2}{3}$

۵) ۲

$f(x)=g(x) \Rightarrow \sin x+\frac{1}{2}\cos x-\frac{3}{2}\sin x \to \frac{1}{2}\sin x=\frac{1}{2}\cos x \to \sin x=\cos x \to x=\frac{\pi}{4}$

$(\frac{\pi}{4}, \frac{3\sqrt{2}}{4})$

$f'(x)=\cos x-\frac{1}{2}\sin x \to f(x)=\frac{\pi}{4} \to f'(\frac{\pi}{4})=\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{4}=\frac{\sqrt{2}}{4} \to y-\frac{3\sqrt{2}}{4}=\frac{\sqrt{2}}{4}(x-\frac{\pi}{4})$

$y=0 \to x=\frac{\pi}{4}-3$

۱۰۰٪ سیاری

۴۹

$f'(x) = 6x^2 - 6x - 12 = 0 \rightarrow x^2 - 1 = 0 \begin{cases} x = -1 \\ x = +1 \end{cases}$

$m_{AB} = \frac{-19-8}{2-(4)}$

$6x^2 - 6x - 12 = -9 \rightarrow 6x^2 - 6x - 3 = 0 \quad \Delta > 0$

(۲) ← ۲

---

۷)

$y = kx^3 + (x+1)x^2 \rightarrow y'' = 6kx + 2k + 2 = 0$

$k\left(\frac{-(k+1)}{3k}\right)^3 + (k+1)\left(-\frac{(k+1)}{3k}\right)^2 < 0 \rightarrow \frac{-(k+1)^3 + 3(k+1)^3}{27k^2} < 0$

$\frac{2(k+1)^3}{27k^2} < 0$

	-1		0	
-	0	+	ت.ن	+

$6kx = -2k - 2 \rightarrow x = \frac{-(k+1)}{3k} > 0$

$\frac{k+1}{3k} < 0$

	-1		0	
+		-		+

$k \in (0, +\infty)$ هیچ مقدار ۲

---

۸)

$y = x^3 + ax^2 + bx - 1 \rightarrow y' = 3x^2 + 2ax + b \rightarrow y'' = 6x + 2a \xrightarrow{y''=0} 6x + 2a = 0$

$3x + a = 0 \rightarrow x = -\frac{a}{3} \xrightarrow{-\frac{a}{3} = -1} a = 3 \qquad y = x^3 + 3x^2 + bx - 1$

$f(x) = -1 \rightarrow -1 + 3 - b - 1 = -4 \rightarrow b = 5 \qquad \frac{a}{b} = \frac{3}{5}$ ۲

---

۹)

$f(x) = x^3 + ax^2 + bx + c \rightarrow f(0) = 4 \rightarrow c = 4 \rightarrow f'(x) = 3x^2 + 2ax + b \rightarrow f'(0) = 0 \rightarrow b = 0$

$f(x) = x^3 + ax^2 + 4 \rightarrow f'(x) = 3x^2 + 2ax$

$x(3x + 2a) \rightarrow x = 0, \; x = -\frac{2a}{3}$ min نسبی $f\left(-\frac{2a}{3}\right) = 0 \rightarrow \left(-\frac{2a}{3}\right)^3 + a\left(-\frac{2a}{3}\right)^2 + 4 = 0$

$a = -3$

$-\frac{2a}{3} = 2$ ۲

---

۱۰)

$f(x) = x^4 - 6x^2 + 5 \rightarrow f'(x) = 4x^3 - 12x = 0 \rightarrow x^3 - 3x = 0 \quad x(x^2 - 3) = 0$

$f''(x) = 12x^2 - 12 = 0$

$x^2 - 1 = 0 \rightarrow x = \pm 1$

$C(1, 0), \; D(-1, 0) \quad m_{CD} = m_{AB} = 0$ ۲

x		$-\sqrt{3}$		0		$\sqrt{3}$	
$f'(x)$	-	0	+	0	-	0	+
$f(x)$	↘	-4	↗		↘	-4	↗

$A \begin{vmatrix} -\sqrt{3} \\ -4 \end{vmatrix} \qquad B \begin{vmatrix} \sqrt{3} \\ 4 \end{vmatrix}$

$$\lim_{x\to 0^+}\frac{f(x)}{x}=0 \rightarrow \lim_{x\to 0^+}\frac{\cos^2(2x)+ax^2+b}{x}=0 \rightarrow \lim_{x\to 0^+}\frac{1+b}{x}=0$$

$$\hookrightarrow \boxed{b=-1}$$

$$\lim_{x\to 0^-}\frac{f'(x)}{x}=2=\lim\frac{-4\sin(2x)\cos(2x)+2ax}{x}=2 \xrightarrow{\text{هوپیتال}}$$

$$\lim_{x\to 0^-}\frac{(-4\times 2x)+2ax}{x}=2 \rightarrow 2a-12=2 \rightarrow 2a=14 \rightarrow \boxed{a=7}$$

$$a+b=7-1=6$$