نیلوفر حیدری — [illegible] — تکلیف (۲۷)

سوال ۱

$\lim_{x\to 0^+} \frac{f(x)}{x} = 0 \rightarrow f(0)=0 \rightarrow \cos^3(2x)+ax^2+b=0$

$1+b=0 \rightarrow b=-1$

$\lim_{x\to 0} \frac{f'(x)}{x} \overset{Hop}{=} \lim \frac{f''(x)}{1} = 2 \rightarrow f''(0)=2$

$f'(x) = 3\cos^2(2x)(2)(-\sin(2x)) + 2ax \rightarrow 6\cos^2(2x)(-\sin(2x)) + 2ax$

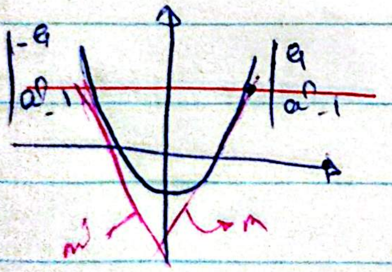
$f''(x) = 12\cos(2x)(-\sin(2x))(-\sin 2x) + (-\cos(2x))(6\cos^2(2x)) + 2a$

$\rightarrow 12(1)(-0)(-0) + (-1)(6) + 2a = 2$

$2a-6=2 \rightarrow 2a=8 \rightarrow a=4$

$a+b=4-1=3$

سوال ۲



$m_d=0$

$m \cdot m' = -1 \rightarrow m = 2x = 2a$

$m' \rightarrow 2x \rightarrow -2a$

$(-2a)(2a) = -1 \rightarrow -4a^2=-1 \rightarrow a^2=+\frac{1}{4}$

$a=\pm\frac{1}{2} \rightarrow y=a^2-1 \Rightarrow \frac{1}{4}-1 = -\frac{3}{4}$

سوال ۳

$f'(x) = \frac{-2a}{(2x-1)^2} \qquad m_d = \frac{\Delta y}{\Delta x} = \frac{6-(-12)}{2.5-(-0.5)} = \frac{18}{3} = 6$

$\frac{-2a}{(2(-0.5)-1)^2} = 6 \rightarrow \frac{-2a}{4} = 6 \rightarrow a=-12$

$f(a) = \frac{-12}{10-1} \rightarrow \frac{-12}{9} = -\frac{4}{3}$

Persian Notebook

Subject:

Date:

سوال ۴

$y'=2 \quad , f(x)=\frac{x+9}{ax+1} \rightarrow f'(x)=\frac{ax+1-ax-a^2}{(ax+1)^2}$

$\xrightarrow{x=1} 2=\frac{(1-a)(1+a)}{(1+a)^2} \rightarrow 2+2a=1-a \rightarrow 3a=-1 \rightarrow a=-\frac{1}{3}$

$y(1) \Rightarrow \frac{1-\frac{1}{3}}{-\frac{1}{3}+1}=1 \Rightarrow 1=2+b \rightarrow b=-1$

$a-b \rightarrow -\frac{1}{3}-(-1)=? \rightarrow ?=\frac{2}{3}$

سوال ۵

$g(x)=f(x) \Rightarrow \frac{3}{4}\sin x=\sin x+\frac{1}{4}\cos x \rightarrow \sin x=\cos x$

$0<x<\pi \rightarrow x=\frac{\pi}{4}$

$f'(x) \Rightarrow \cos x-\frac{1}{4}\sin x \xrightarrow{x=\frac{\pi}{4}} \frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{8} \rightarrow \frac{\sqrt{2}}{4}=m$

$y=\frac{\sqrt{2}}{4}x+b \rightarrow (\frac{\pi}{4},\frac{3\sqrt{2}}{4}) \rightarrow y-\frac{3\sqrt{2}}{4}=\frac{\sqrt{2}}{4}(x-\frac{\pi}{4})$

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

$x=-3+\frac{\pi}{4}$

سوال ۶

$f'(x)=0 \Rightarrow 9x^2-9x-18=0 \quad x^2-x-2=0 \rightarrow (x-2)(x+1)=0$

$A=(2,-19) \quad B=(-1,8) \rightarrow m_{AB}=\frac{8-(-19)}{-1-2} \rightarrow \frac{27}{-3}=-9$

$9x^2-9x-18=-9 \rightarrow 3x^2-3x-6=-3 \rightarrow 3x^2-3x-3=0$

$x^2-2x-1=0 \quad \Delta=4+56=60 \rightarrow \Delta>0 \rightarrow$ دو ریشه ← دو نقطه

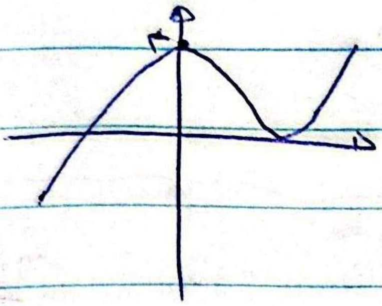
سوال ۸

$A(-1,-4) \xrightarrow{\text{نقطه عطف}} \frac{-a}{3} = -1 \rightarrow a=3$

$-1+a-b-1 = -1+3-b-2 = -4 \rightarrow b=5$

$\frac{a}{b} = \frac{3}{5}$

سوال ۹



$f(x) = x^3 + ax^2 + bx + c$

$f(0) = 4 \rightarrow c = 4$

$f'(x) = 3x^2 + 2ax + b = 0$

$f'(0) = 0 \rightarrow b = 0$

$x(3x+2a) \rightarrow x=0$

$\quad \rightarrow x = -\frac{2a}{3}$

$f\left(-\frac{2a}{3}\right) = -\frac{8a^3}{27} + \frac{12a^3}{27} + 0 + 4 \rightarrow \frac{4a^3}{27} + 4 = 0 \rightarrow a = -3$

$x = \frac{-2(-3)}{3} \rightarrow x = 2$

سوال ۱۰

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

$-\sqrt{3}$		0		$\sqrt{3}$	
$-$	$+$		$-$		$+$

$A=(\sqrt{3},-4),\ B=(-\sqrt{3},-4)$

$f''(x) = 12x^2 - 12 \Rightarrow$

	-1		1	
$+$		$-$		$+$

$C=(1,0)\ D=(-1,0)$

$m_{AB} = \frac{\Delta y}{\Delta x} = \frac{0}{2\sqrt{3}} = 0 \qquad m'_{CD} = \frac{0}{2} = 0$

$\tan\alpha = \left|\frac{m+m'}{1-mm'}\right| \rightarrow 0 \rightarrow \alpha = 0$ یا 180