لیدیا مرادی — گروه ۲ A دوازدهم — تکلیف شماره ۲۷

۱- $f(0^+) = 1 + 0 + b = 0 \Rightarrow b = -1$

$\lim_{x\to 0^+} \frac{f'(x)}{x} = \frac{3\cos^2 2x \times (-2\sin 2x) + 2ax}{x} \overset{HOP}{\Rightarrow} -4\cos 2x \times 3\cos^2(2x) + 2a = 2$

$\Rightarrow a = 7 \Rightarrow a+b = 6$

۲- $2x = \pm 1 \Rightarrow x = \pm\frac{1}{2} \Rightarrow y = \frac{1}{4} - 1 \Rightarrow 2y = -\frac{3}{2}$

۳- $y - 6 = \frac{-12-6}{-0.5-2.5}(x - 2.5) \Rightarrow y = 6x - 9$

$6x - 9 = \frac{a}{2x-1} \Rightarrow a = 6x - 9 \times 2x - 1 \Rightarrow$ ~~f(5)~~

$\Rightarrow f'(x) = \frac{-2a}{(2x-1)^2} = 6 \Rightarrow \frac{-2(6x-9)(2x-1)}{(2x-1)^2} = 6$

$\Rightarrow x = 1 \Rightarrow a = -3 \Rightarrow f(5) = \frac{-3}{9} = -\frac{1}{3}$

۴- $y' = \frac{x - a^2}{(ax+1)^2} \Rightarrow \frac{1-a^2}{(a+1)^2} = 2 \Rightarrow 3a^2 + 4a + 1 = 0 \Rightarrow a = -\frac{1}{3}$ ✓ , -1 ✗

$\frac{\frac{2}{3}}{\frac{2}{3}} = 2 + b \Rightarrow b = -1 \Rightarrow -\frac{1}{3} + 1 = \frac{2}{3}$

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

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

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

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