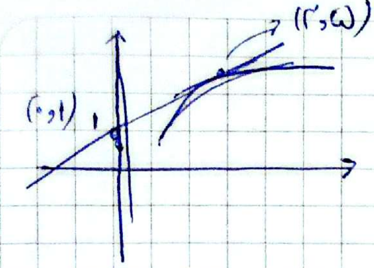
آرین عضدنفری سوادکوهی

۱-



خط گذرنده و مماس بر (۳،۵) ← (۳،۵)

$y = \frac{4}{3}x + 1 \qquad f'(3) = \frac{4}{3}$

۲-

خط مماس ⇐ $y = \frac{1}{3}x + \frac{4}{3}$ $\qquad \sqrt{9x-1} = \frac{1}{3}x + \frac{4}{3} \rightarrow x^2 + (8-81)x + 25 = 0 \rightarrow \Delta = 0$

$x = \frac{2}{3}$ ← تعریف نمی‌شود

$\sqrt{2x-1} = 5 \leftarrow x = 2$

$x = 5$

۳-

$y = \frac{x^2 + mx + 1}{x+3} \xrightarrow[f(1) = \frac{3}{4}]{x=1} f'(x) = \frac{x^2 + 6x + 3x - 1}{(x+3)^2} = \frac{3x+6}{16} = \frac{3}{4} \Rightarrow x = 2 \rightarrow f(1) = 1$

$4y - 3x = n$

$y = \frac{3x+n}{4} \qquad \frac{3+n}{4} = 1 \qquad n = 1 \qquad m + n = 3$

۴-

$(3g' - f')(\frac{5}{4}\pi) \qquad f(x) = \frac{(3 - \sin x)(9 + \sin^2 x + 3\sin x)}{(3 - \sin x)(3 + \sin x)} \Rightarrow f'(x) = \frac{\sin^2 x \cos x + 6\sin x \cos x}{(3 + \sin x)^2}$

$g'(x) = \frac{-3\cos x}{(3 + \sin x)^2}$

$(3g' - f')(\frac{5}{4}\pi) = \frac{-9\cos x - \sin^2 x \cos x - 6\sin x \cos x}{(3 + \sin^2 x)^2} = \frac{-6/5 - \frac{\sqrt{2}}{4} + \frac{4}{3}\sqrt{2}}{(6 - \frac{\sqrt{2}}{2})^2}$

۵-

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

۶-

$f(x) = xg(x) + 1 \qquad g(x) = \frac{f(x) - 1}{x} = \left(\frac{-1 + \sin x}{1 + \sin x}\right)^3 - 1$

$\lim_{x \to 0} g(x) \overset{hop}{=} 3\left(\frac{-1 + \sin x}{1 + \sin x}\right)\left(\frac{\cos x(1 + \sin x) - \cos x(-1 + \sin x)}{(1 + \sin x)^2}\right) = 3(-1)(1+1) = -6$

۷-

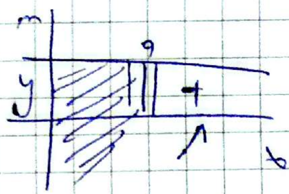
$x^2+1 \xrightarrow{\text{قرینه نسبت به}} -x^2+4$ $\quad f'(x)\,f'(-x)=-1 \quad (x>0)$

$f'(x)=-2x \qquad -2x \times 2x=-1 \qquad x^2=\frac{1}{4} \qquad x=\pm\frac{1}{2} \rightarrow$ منفی پذیرفته نیست

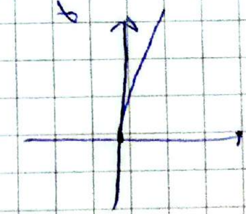
$d: y=-\frac{5}{4}$ $\quad$ فاصله خط $\leftarrow 1{,}25$

۸-

$f(x)=2\sqrt{x}\,(4x^2+3) \qquad f'(x)=2\left(\frac{12x^2+3}{2\sqrt{x}}\right) \rightarrow$



$f'(0) \rightarrow$ می‌رود به ← شیب خط $+\infty$



۹-

$f(x)=\frac{\sqrt{x}}{-2x^2+x-1} \rightarrow f'(x)=\frac{+6x^2-x+1}{(-2x^2+x-1)^2}=-1$ $\quad$ نقطه مبدأ مختصات است

$f \; (0,0)$ در تابع کار کن

$y=0$

۱۰-

$fog(x)=\left(\frac{1}{\sqrt{x^2-1}}\left[\frac{1}{\sqrt{x^2-1}}\right]\right)^3=\left(\frac{2}{\sqrt{x^2-1}}\right)^3 \xrightarrow{\text{مشتق}} \frac{6}{\sqrt{x^2-1}} \quad \frac{6\sqrt{x^2-1}}{2x}$

$\lim_{x\to\frac{\sqrt5}{2}} fog(x) \quad \left[\frac{1}{\sqrt{x^2-1}}\right]=2$

$\frac{6}{x}=\frac{12}{\sqrt5}$ $\qquad \frac{\frac{12\sqrt5}{\sqrt5}}{-48\sqrt5}=-\frac{1}{15}$

$(x^2+y^2-1)^3-x^2y^3=0$

♡ :)