1a) $(\sin x \cdot \cos x)' = \cos^2 x - \sin^2 x$

b) $(\ln(2x+1)^3)' = \dfrac{3}{2x+1}$

c) $\left(\sqrt{\sin^2(\ln(x^3))}\right)' = \dfrac{1}{2\sqrt{\sin^2(\ln(x^3))}} \cdot \dfrac{2\sin(\ln(x^3)) \cdot \cos(\ln(x^3)) \cdot 3}{x} = \dfrac{3\sin(2\lg(x)^3)}{2\sqrt{\sin^2(\ln(x^3))}\, x}$

d) $\left(\dfrac{x^4}{\ln(x)}\right)' = \dfrac{4x^3 \cdot \ln x - x^3}{\ln^2 x} =$

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2) $f(x) = \cos(x^2+3x)$

$f'(x) = -\sin(x^2+3x) \cdot (2x+3)$

$x_0 = \sqrt{7}$

$f'(x) = -\sin(7+3\sqrt{7}) \cdot (2\sqrt{7}+3) = -5{,}383$

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3) $f(x) = \dfrac{x^3-x^2-x-1}{1+2x+3x^2-4x^3}$

$f'(x) = \dfrac{(x^3-x^2-x-1)' \cdot (1+2x+3x^2-4x^3) - (1+2x+3x^2-4x^3)' \cdot (x^3-x^2-x-1)}{(1+2x+3x^2-4x^3)^2} =$

$= \dfrac{(3x^2-2x-1) \cdot (1+2x+3x^2-4x^3) - (2+6x-12x^2) \cdot (x^3-x^2-x-1)}{(1+2x+3x^2-4x^3)^2}$

$x_0 = 0$

$f'_x = 1$

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4) $f(x) = \sqrt{3x} \cdot \ln x$

$f'(x) = \dfrac{\ln x}{2\sqrt{3x}} + \dfrac{\sqrt{3x}}{x}$

$x_0 = 1 \Rightarrow f'(1) = 0 + \sqrt{3}$

$\operatorname{tg}\alpha = \sqrt{3} \Rightarrow \alpha = 60^\circ$