

1. Compute the derivative y' of $x^3 - xy + y^3 = 1$.
2. Compute the derivative y' of $(xy + 7)^2 = 2y$.
3. Compute the equation of the tangent line to the curve $2xy + \pi \sin y = 2\pi$ at $(1, \pi/2)$.

4. Consider the folium of Descartes whose equation is $x^3 + y^3 = 9xy$. Find y' .
Then explain the steps to find the point(s) at which the tangent line is horizontal.

It this is too easy, one can then ask: find the coordinates of these points .

5. Compute the slope of the tangent line of the lemniscate $x^4 + 2x^2y^2 + y^4 = 16(x^2 - y^2)$ at the point $(4, 0)$.

It students are done, one can ask to compute extra derivatives (or tangent lines), for example for the curves: $e^{2x} = \sin(x + 3y)$ and $(x^2 + y^2)^2 = 16x^2 - 16y^2$ (which is also a lemniscate).