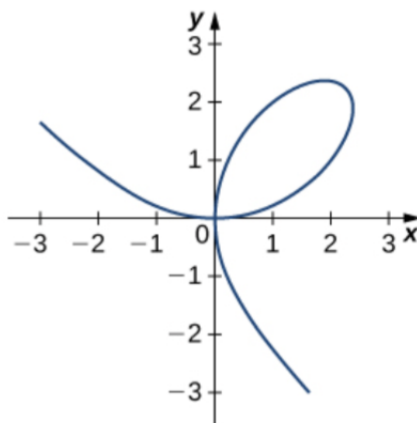

IN-CLASS ACTIVITY : IMPLICIT DIFFERENTIATION

1. Find the equation of the tangent line to the hyperbola $x^2 - y^2 = 16$ at the point $(5, 3)$.
2. Compute the derivative of the following functions :
 - i) $f(x) = x^6 + 3x^2 + 4x^4 - 1$
 - ii) $f(x) = x \sin(x) + e^x \tan(x) + 2$
 - iii) $f(x) = \sqrt{x} \sin(x)$
 - iv) $f(x) = (x^2 - 8x + 6) \tan(x)$
 - v) $f(x) = (x^2 + e^x) \cos(x)$
 - vi) $f(x) = \frac{x^2 - 7x + 2}{x - 3}$
 - vii) $f(x) = \frac{e^x + x}{e^x - 5}$
 - viii) $f(x) = \sqrt[5]{x^3} \sin^2(x)$
 - ix) $f(x) = \frac{\sin^2(x) + \sqrt{x}e^x}{\cos^2(x) + x^2e^{-x}}$
3. Find the equation of the tangent line to the curve of equation $xy^2 + \sin(\pi y) - 2x^2 = 10$ at the point $(2, -3)$.
4. Below is the graph of the folium of Descartes, described by the equation $2x^3 + 2y^3 - 9xy = 0$.



- i) Find the equation of the tangent line at the point $(2, 1)$.
 - ii) Find the equation of the normal line to the tangent line at the point $(2, 1)$.
5. The number of cell phones produced when x dollars is spend on labor and y dollar is spent on capital invested by a manufacturer can be modelled by the equation $6x^{\frac{3}{4}}y^{\frac{1}{4}} = 3240$. Find $\frac{dy}{dx}$ at the point $(81, 16)$.