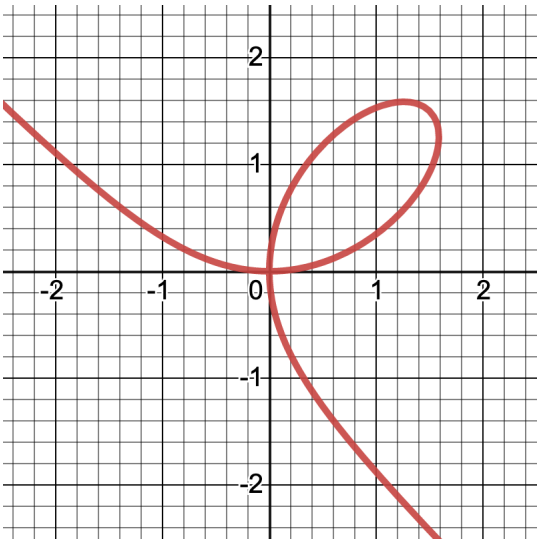
## SECTION 3-8: IMPLICIT DIFFERENTIATION

1. Motivating questions: How can we find slope of the tangent / velocity for a graph that looks like the one below?




Tangent line to $y^3 + x^3 = 3xy$ at $(3/2, 3/2)$?

2. What is the derivative of: $(f(x))^3$ ?

3. Repeat question 2 above but with Leibniz notation. What is $dy/dx$ for: $(y)^3$ ?

4. What is the derivative of $3xg(x)$ ?

5. Repeat question 4 above but with Leibniz notation. What is $dy/dx$ for: $3xy$ ?

6. Find $dy/dx$ for each expression below.

   (a) $y\cos(x) + 2x = (y+1)^2$

   (b) $x + \tan(xy) = 5$

7. For the equation $x^2 + xy + y^2 = 9$,

   (a) find the $x$ intercept(s)

   (b) Find the slope of the tangent lines at the $x$-intercepts.

   (c) Write the equations of the tangent lines at the $x$-intercepts.

   (d) Sketch a picture of the curve and its tangent lines from part (c)