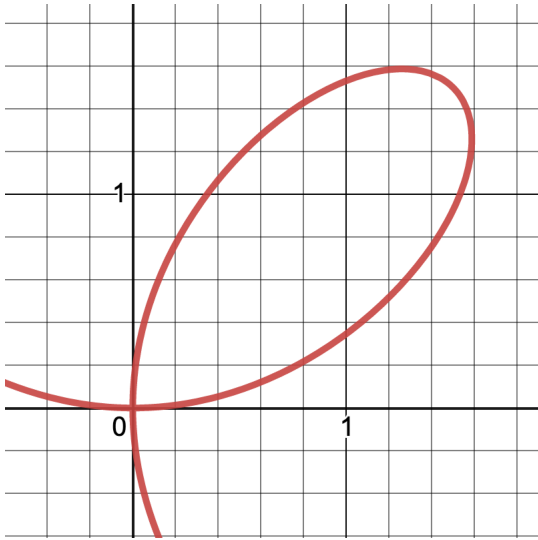## SECTION 3-8: IMPLICIT DIFFERENTIATION

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) $x^2 + y^3 = \cos(x) + \sin(y) + \pi/2$

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

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

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.

3-8 Implicit Differentiation