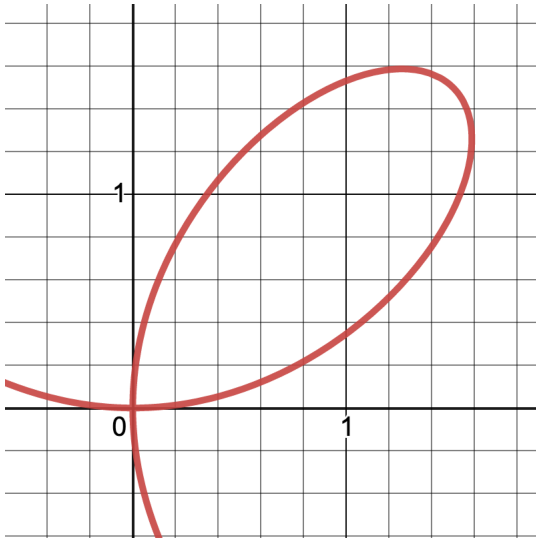


SECTION 3-8: IMPLICIT DIFFERENTIATION

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 $\frac{d}{dx} [(f(x))^3]$?

3. Repeat question 2 above but with Leibniz notation assuming $y = y(x)$. Find dy/dx for $(y)^3$.

4. Find $\frac{d}{dx} [3xg(x)]$.

5. Find dy/dx for $3xy$ assuming $y = y(x)$.

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.