Chapter 3.7: Implicit Differentiation

Calculus I

College of the Atlantic. Fall 2014

1. Implicitly differentiate the following functions:

   (a) $x^2 + y^2 = 16$.
   (b) $x^2 + xy + y + 17 = 0$.

2. Consider the "function" defined implicitly by the equation:

$$y^3 - xy = -6\ . \tag{1}$$

   A graph of this "function" is shown in the figure.

   (a) Convince yourself that you do not want to solve for y.
   (b) Implicitly differentiate Eq. (1) and solve for y'.
   (c) Verify that the point $x = 7$, $y = 2$ satisfies Eq. (1).
   (d) Find the slope of the line tangent to the curve at $x = 7$, $y = 2$.

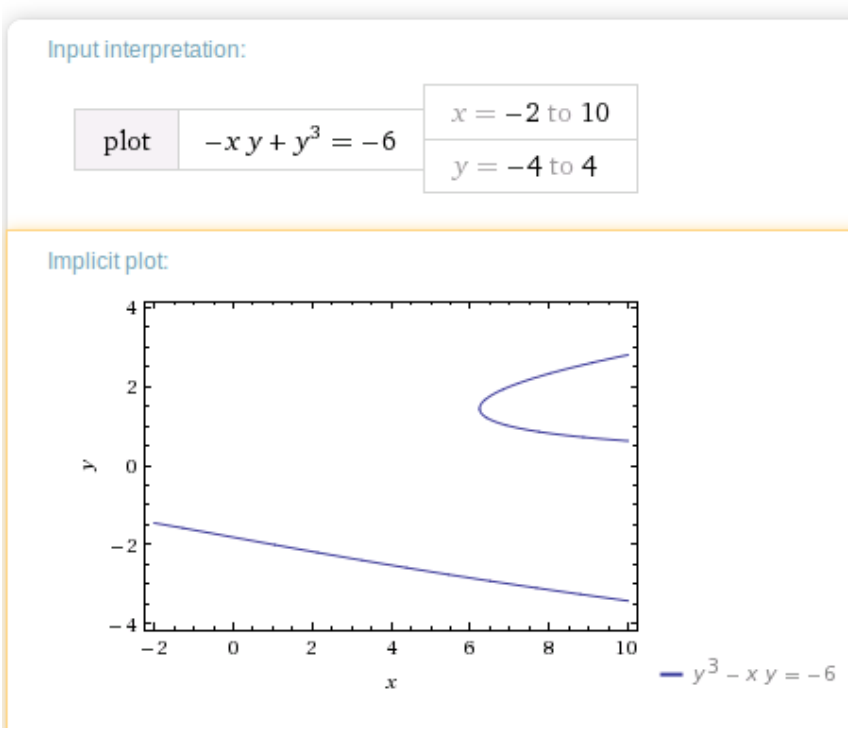

Figure 1: A bifurcation diagram.