ASSIGNMENT 10

There are two parts to this assignment. The first part is on WeBWorK — the link is available on the course webpage. The second part consists of the questions on this page. You are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence and elegance of your solutions. Your solutions must be typed, with your name and student number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together.

Your written assignment must be handed in before your recitation on Friday, November 24. The online assignment will close at 9:00 a.m. on Friday, November 24.

1. In this question you will sketch the curve $C$ described by the equation $x^2 - y^2 = 1$.
   (a) Describe and justify the domain of $C$.
   (b) Write down the $x$- and $y$-intercepts of $C$.
   (c) Use implicit differentiation to determine where $C$ is increasing and where it is decreasing. Note that you will have to describe this using more than just $x$-values, since an $x$-value on the domain may yield two $y$-values.
   (d) Use implicit differentiation to determine where $C$ is concave up and where it is concave down.
   (e) Draw a large sketch of $C$.

2. Suppose you have four points on the corners of a square of side length $L$. Construct a path of minimal length that connects all four points. You must justify your path arrangement, but you may assume without proof that the shortest distance between two points on a plane is a straight line.