Problem Set #1

due Monday, February 2, 2004

1. Draw a straight line. Prove that it is straight.
2. Prove that the curve $x^3 = y^2$ does not have a C^1 regular parameterization.
3. Consider the function

$$f(x) = \begin{cases} x\sin(\frac{\pi}{x}) & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

   Is the graph of $f(x)$ between $x = 0$ and $x = 1$ rectifiable? If so, compute its length.