Name:_____

Math 2250 Exam #2
October 14, 2011

Instructions: You are welcome to use one sheet of notes, but no other references or tools are allowed (no textbooks, no calculators, etc.). This is a 50 minute exam; you may start working at 1:25 PM and must stop at 2:15 PM. To receive full credit for a correct answer you must demonstrate how you arrived at that answer. To receive partial credit for an incorrect answer your work must be clearly explained.

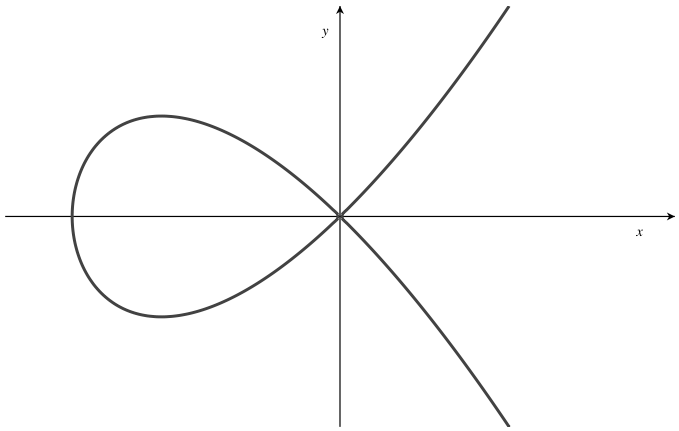
1. (6 points) Find the derivatives of the following functions.

   (a) $f(x) = \ln(\arctan(x))$

   (b) $g(x) = \frac{\sin(x)}{\cos^2(x)}$
   (*Hint: there's an easy way and a hard way to do this*)

2. (5 points) Let $f(x) = 3^{x \ln(x)}$. What is $f'(0)$?

3. (5 points) The curve determined by the equation $y^2 = x^2(x+1)$, pictured below, is called the Tschirnhausen cubic. At what points does this curve have a horizontal tangent line?



4. (5 points) The volume of a cube increases at a rate of 1 cm^3 per minute. How fast is the surface area of the cube increasing when the length of an edge is 3 cm?

5. (5 points) Suppose that you are interested in computing the area of the right triangle pictured below and you determine that the right triangle is isosceles (this is easy to do using a compass). If you are able to measure the length of one of the short sides with a maximum error of 1%, how accurately can you compute the area of this right triangle?