Name:_____

Signature: _____

I accept full responsibility under the Haverford Honor System for my conduct on this exam.

Math 113 Exam #3
December 3, 2010

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 55 minute exam; you may start working at 10:35 AM and must stop at 11:30 AM. 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. Please hand in your exam with the honor pledge signed.

1. Evaluate the limit

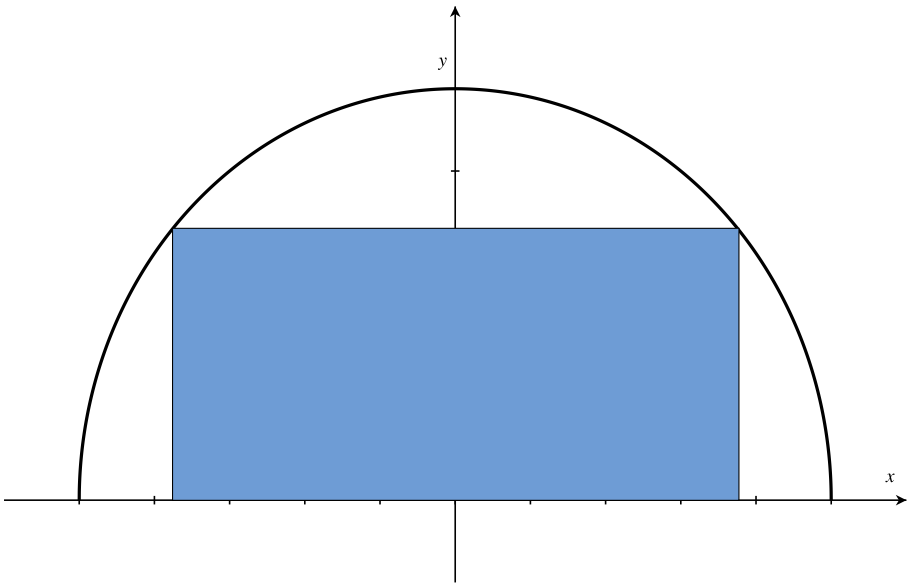
$$\lim_{x \to +\infty} x \tan\left(\frac{1}{x}\right).$$

2. For what value of c does the function $f(x) = x + \frac{c}{x}$ have a local minimum at $x = 3$?

3. Draw the graph of the function $g(x) = 4x^3 - x^4$. Label any local maxima or minima, inflection points, and asymptotes, and indicate where the graph is concave up and where it is concave down.

4. Suppose that

$$h'(u) = \frac{u^2 + 1}{u^2} \quad \text{and that} \quad h(1) = 3.$$

What is $h(2)$?

5. A rectangle is bounded by the x-axis and the graph of the function $f(x) = \sqrt{25 - x^2}$ as shown in the figure below. What length and width should the rectangle be so that its area is maximized?