Math 170-009 **In Class Assignment 1** **Sep. 16, 2008**

Names:_____

1. Determine the asymptotes (horizontal, vertical, and oblique) of the function

$$y = \frac{x^3}{x^2 - 1}. \tag{1}$$

Use this information to sketch the function over the interval $[-4, 4]$. Show your work.

2. At what points is the function

$$f(x) = \frac{1 - \cos x}{x^2} \tag{2}$$

continuous. If it fails to be continuous at a point, can you make a continuous extension of the function at this point of dicontinuity? If so, write it out and explain.

3. Let $f(x) = x^2 - 1$.

   (a) Compute the slope of the curve at the point $x = 3$, and write an equation for the tangent line.

   (b) Compute the derivative of $f(x)$ at the point x_0.

4. Let $f(x) = \frac{1}{x^2}$.

   (a) Find the slope of the curve at the point $x = a$.

   (b) Where does the slope equal 1/4?

5. If a rock, initially at rest is dropped from a height of 400 feet its height after t seconds is given by $s(t) = -16t^2 + 400$. How long does it take to hit the ground and what is its velocity at impact?