Homework 3 - Math 1451-008 (Howle)
Due Monday 3/5/2012 in class

Name: _____   R Number: _____

This cover sheet must be attached as the top page of your homework.
See homework requirements in the syllabus.

1. Find the derivative of $cos(x)$ **using the limit definition** of the derivative.

2. Use implicit differentiation to find $\frac{dy}{dx}$ when y is defined as a function of x by

$$6\cos(x - y) = 3y\cos(x).$$

3. Given $y = \tan x$, find $y'(x)$, $y''(x)$, and $y'''(x)$.

4. Let the function $s(t) = t^4 - 4t^3$ denote the position (in feet) at time t (in seconds) of an object moving along a line, where $t \geq 0$.

   (a) Find the formula for the velocity as a function of t. Determine all intervals over which the object is advancing (i.e., has positive velocity) and all intervals over which the object is retreating (i.e., has negative velocity).

   (b) Find the formula for the acceleration as a function of t. Determine all intervals over which the object is accelerating (i.e., has positive acceleration) and all intervals over which the object is decelerating (i.e., has negative acceleration).

   (c) Determine the total distance traveled by the object over the time interval $t = 0$ to $t = 4$.