Calculus Lab 4

25 October 2006

Work in pair or individually, as you wish. When you are done, I would suggest printing out your work and/or emailing it to yourself. You will likely want to refer to this stuff when doing later homework problems.

Goals:

- Learn how to use Maple to take derivatives.
- Learn how to work with derivatives to analyze functions.

1. Use maple to find the derivatives of the following functions:
   (a) $f(x) = \ln(4x^3 + 2)$
   (b) $f(x) = 3\sin^{-1}(2x)$
   (c) $f(x) = \sin(3x)\ln(2x)$
   (d) $f(x) = \sin(\ln(3x))$
2. Consider the following function:

$$h(x) = 1 + x - 2x^2 + \frac{1}{2}x^3 \; . \tag{1}$$

   (a) Plot $h(x)$. Choose a range so that the function's key features are evident.
   (b) For what values of x does $h(x) = 0$? Estimate graphically and by using the *solve* command.
   (c) Plot $h'(x)$.
   (d) For what values of x does $h'(x) = 0$? What are the meaning of these points?
   (e) On your plot of $h(x)$ you should have seen two wiggles. Find the coordinates (i.e., x value and y value) of each of these wiggles.