MthT 430 Problem Set 12

In class November 28, 2007 – Turn in December 5, 2007

A typed paper is preferred, but a neat hand written paper is OK.

Group Work Rules:

- You are encouraged to work together!
- Away from the group, do your own neat write up of the problems.
- Acknowledge the group members and any other person/resource you use.

1. Differentiate – *Do not simplify your answer.*
   - $y = \sin(1/x)\cos\left(\ln\left(\dfrac{x}{x^2+4x+4}\right)\right)$

   Extra Credit: What is the domain of the function?
   - $f(x) = \sin(\cos(\sin(2x)))$
2. Spivak Chapter 10, Problem 6.
3. Spivak Chapter 10, Problem 15.
4. Approximation of the derivative. See also Spivak Chapter 9, Problem 22.
   - Let $f(x) = x^2$. Let $h > 0$. Compare $f'(0)$ with the *centered difference quotient at* 0:
   $$\frac{f(0+h) - f(0-h)}{2h}.$$
   - Let $f(x) = x^2$. Let $h > 0$. Compare $f'(a)$ with the *centered difference quotient at* a:
   $$\frac{f(a+h) - f(a-h)}{2h}.$$
   - Let $g(x) = Ax^2 + Bx + C$ be a quadratic polynomial. Let $h > 0$. Compare $g'(a)$ with the *centered difference quotient for* g *at* a:
   $$\frac{g(a+h) - g(a-h)}{2h}.$$