Math 117 / SyDe 111 Assignment *3 Fall 2006

due: October 6th

1. MEM p. 155 *1 (a bit of review of week 1 material)
   ↖ find domains for both h and k – answer in back of text is incorrect!
2. MEM p. 156 *11 b
3. MEM p. 129 *54 c, a (You should be able to deduce the shape of the graphs from the properties of sine and cosine, without the use of any graphing device. Part (c) is easier than part (a).)
4. Some extra background: Your instructor may or may not have introduced you to the hyperbolic functions, which are defined as

$$\cosh x = \frac{e^x + e^{-x}}{2}, \qquad \sinh x = \frac{e^x - e^{-x}}{2}.$$

(These are in fact the even and odd components of the exponential; you can see that $\cosh x$ is even, $\sinh x$ is odd, and $\cosh x + \sinh x = e^x$.)

→ From these definitions, show that $\cosh 2x = 1 + 2\sinh^2 x$.

(In fact, the hyperbolic functions obey a very similar set of identities to that of the trigonometric functions. The only difference is in the sign of any product of two sines – this is "Osborn's Rule". See pages 134-139 of MEM.)

5. MEM p. 156 ※ 12b (You may omit the sketch, and we'll take it as obvious that $f(x) = x^3 + x$ is one-to-one.)

6. MEM p. 421 ※ 5.

7. MEM p. 422 * 10. Note: This is a problem more of logic than of calculus; a classic "word problem". Try to make your solution as clear as possible.... complete sentences are encouraged!!! Also be aware that there is an error in the general formula as given in the text; if your logic is sound you should get something slightly different!

* END *

Other suggested problems for practise:

p. 128 ※ 41, 42, 47, 54b

p. 156 * 11 a,c