Homework 7 for Math 480A
http://wiki.wstein.org/2008/480a
Due Wednesday May 21, 2008

Each problem has equal weight, and parts of problems are worth the same amount as each other. There are **4 problems**. I have office hours MWF 2:30-3:30 in Sieg 312, unless otherwise stated. You can email me about problems; all responses will be cc'd to `sage-uw`, so you may want to subscribe to that mailing list.

1. The following bit stream describes a number using the 64-bit IEEE 754-1985 floating point number encoding:

   1001110000011010100001001111111110110101111011010011011100000100

   Exactly what number does the above number correspond to?

2. What is the image of the interval $[2, 3]$ under the function $\sin(\cos(x^2))$?

3. For each of the following functions decide whether or not it has a zero on the interval $[0, 1]$, and if so find it to at least 2 decimal digits of precision.

   (a) $\dfrac{\cos(x + 1)}{\sqrt{100x + 1}}$

   (b) $x^2 - x + \frac{1}{4}$

   (c) $\dfrac{1}{x + \frac{1}{100}} - x^{100}$

4. Let $f(x) = \frac{x}{2} + \frac{1}{x}$. What is the limit of the following sequence?

$$f(3), f(f(3)), f(f(f(3))), f(f(f(f(3)))), \ldots$$