**Math 421** **Problem Set 3 *bis*** **Fall, 2006**

## Do by Friday, Oct. 13; do *not* hand in!

1. Do page 90, Exercise 8.
2. Do page 91, Exercise 10.
3. Do page 78, Exercise 2 (b) and (d). The domain of each function is understood to consist of all complex $z$ for which the quotient makes sense.
4. Do page 78, Exercise 10.
5. Do page 84, Exercise 4.
6. (a) Do page 84, Exercise 6 (a). [All you need to do is to show that $\big(f_2(x)\big)^3 = z$ for all z in the domain of $f_2$.]

   (c) Do page 84, Exercise 6 (c).

## Extra credit problems—due Wednesday, Oct. 18

1. For page 90, Exercise 8 (see #1, above), use `Cardano3` to draw the given set and its image, too—first in the complex plane and then on the Riemann sphere.
2. Find explicit formulas for the stereographic projection $q\colon \widehat{\mathbb{C}} \to \Omega$ and its inverse $p\colon \Omega \to \widehat{\mathbb{C}}$. Here $\Omega$ is the Riemann sphere and $\widehat{\mathbb{C}} = \mathbb{C} \cup \{\infty\}$ is the extended complex plane. Of course $q(\infty) = (0,0,1)$, the North pole and $p(0,0,1) = \infty$, so all you need to do is find formulas for $q(z)$ when $z \in \mathbb{C}$ and for $p(u,v,w)$ when $(u,v,w) \in \Omega$ with $w \neq 1$.