Homework 12
Due: Friday, May 5

*Don't hand this in, but please work it out:*

In class, given $\gamma = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \in \mathrm{SL}_2(\mathbb{R})$, we defined $f_\gamma \in \mathrm{Aut}(\mathbb{H})$ as

$$f_\gamma(z) = \frac{az+b}{cz+d}.$$

- Verify that the map of sets
$$\mathrm{SL}_2(\mathbb{R}) \longrightarrow \mathrm{Aut}(\mathbb{H})$$
is a group homomorphism, by checking that
$$f_{\gamma_1 \cdot \gamma_2} = f_{\gamma_1} \circ f_{\gamma_2}.$$

1. [SS]8.4. *It turns out there is no such holomorphic bijection.*

2. [SS]8.11.

3. (a) Let $f : U \to V$ be a conformal map. Let $g : U \to V$ be any (other) conformal map. Explain why there exists some $\delta \in \mathrm{Aut}(V)$ such that $g = \delta \circ f$.

   (b) [SS]8.14.