

**MATH 341: TOPICS IN GEOMETRY  
HOMEWORK DUE FRIDAY WEEK 12**

*Problem 1.* Show that  $\mathrm{PSL}_2(\mathbb{Z})$  contains three subgroups of index 3 which contain  $\Gamma(2)$ . Find fundamental domains for these groups; use the fundamental domains to write down small generating sets for the groups.

*Problem 2.* Let  $G$  be the subgroup of  $\mathrm{PGL}_2(\mathbb{R})$  generated by  $\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$  and  $\begin{pmatrix} 3 & 4 \\ 2 & 3 \end{pmatrix}$ . Find a fundamental domain for  $G$ .