MATH 351: RIEMANN SURFACES AND DESSINS D'ENFANTS HOMEWORK #14

Problem 14.1. We showed in class that the only spherical triples are $(2,2,c)$ (with $c \in \mathbb{Z}_{\geq 2}$) and $(2,3,3),(2,3,4),(2,3,5)$. In each of these cases, draw these triangles on a sphere. How many of them are necessary to cover (tessellate)? If you flatten these triangles, the last three correspond to Platonic solids: what are they? *[Hint: Buy some oranges! And compare*

`http://www.cems.uvm.edu/~jvoight/351/Magnus.pdf`

to your answer.]

Problem 14.2. Show that in any geometry (spherical, Euclidean, or hyperbolic), the composition of two reflections whose axes meet at a point p at an angle θ is given by rotation by 2θ around p. *[Hint: Do each case separately. In the spherical case, take $p = \infty$ and argue the corresponding reflections in $\mathbb{C}$. For $\mathbb{C}$, you may assume that one axis is the horizontal axis; do one matrix calculation. For $\mathbb{H}$, move to $\mathbb{D}$ and take $p = 0$.]*

Date: Monday, 11 February 2013.