Homework 5

Instructions

Complete the exercises on this page and upload your work to Gradescope by **12:29pm on March 25**.

Be sure to **acknowledge your collaborators**.

Exercises

1. It can be shown that there is a regular quadrilateral X in the hyperbolic plane $(\mathbb{H}^2, d_{\text{hyp}})$ whose four sides have the same length and whose four angles are equal to $\frac{3}{7}\pi$. Is there a tessellation of $(\mathbb{H}^2, d_{\text{hyp}})$ whose tiles are all isometric to X?

2. Textbook exercise 6.2.

3. Textbook exercise 6.3.
   Hint: If there were a tessellation with infinitely many tiles, we could build a sequence whose terms lie in distinct tiles, and the compactness of (S^2, d_{sph}) would give us a convergent subsequence. What could you say about the limit of this subsequence?

4. Textbook exercise 6.4.

5. Textbook exercise 6.5.

6. Textbook exercise 6.8.
   Additional Hint: You'll eventually want to use Proposition 5.13; what angles α, β, γ do you need?