

§24 Hyperbolic Symmetry Patterns

This part is an introduction to hyperbolic wallpaper patterns.

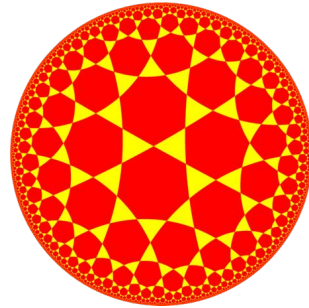
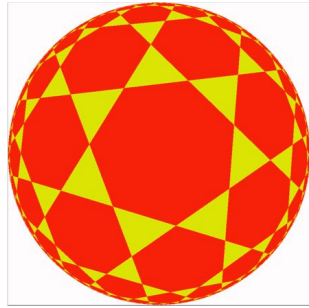
References:

- Symmetries of Things, Chapter 17

Hyperbolic tilings

What is the signature of the hyperbolic soccerball pattern?

What is its cost?

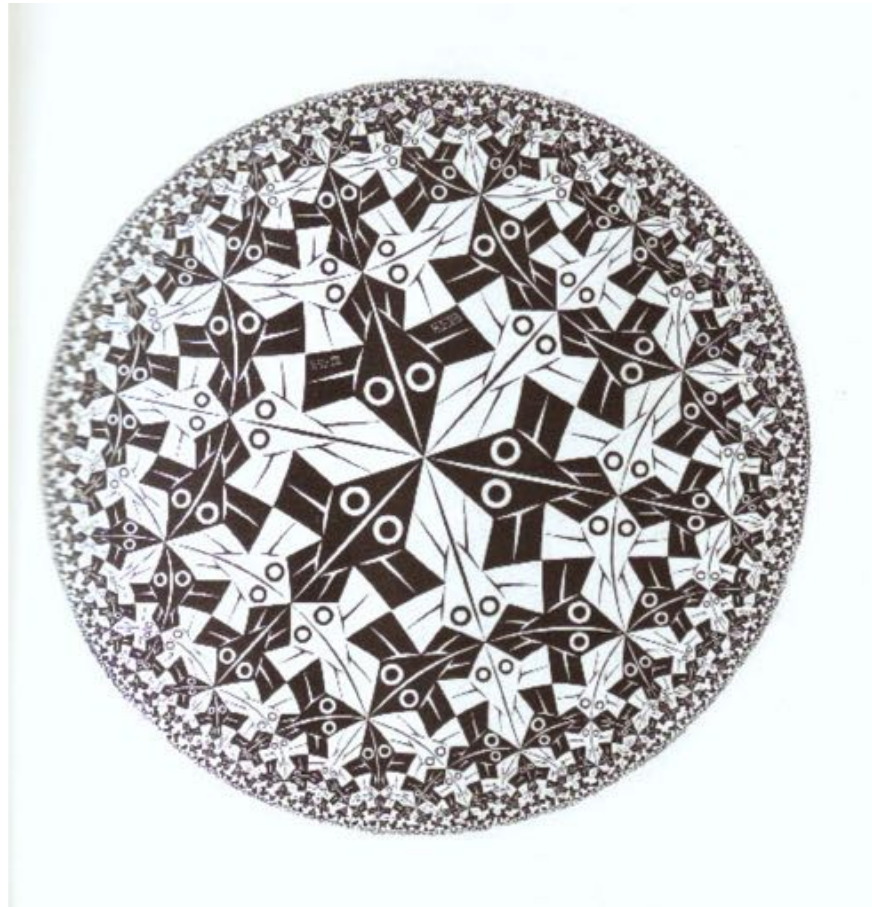


The Klein Model The Poincare Disk Model

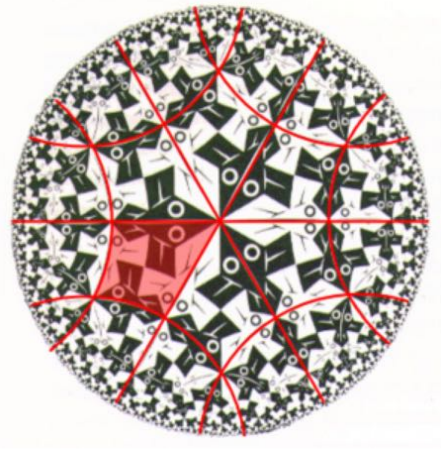
What is the signature of this hyperbolic wallpaper pattern?

What is true about the cost of a negatively curved wallpaper pattern?

Escher Circle Limits



Circle Limit 1



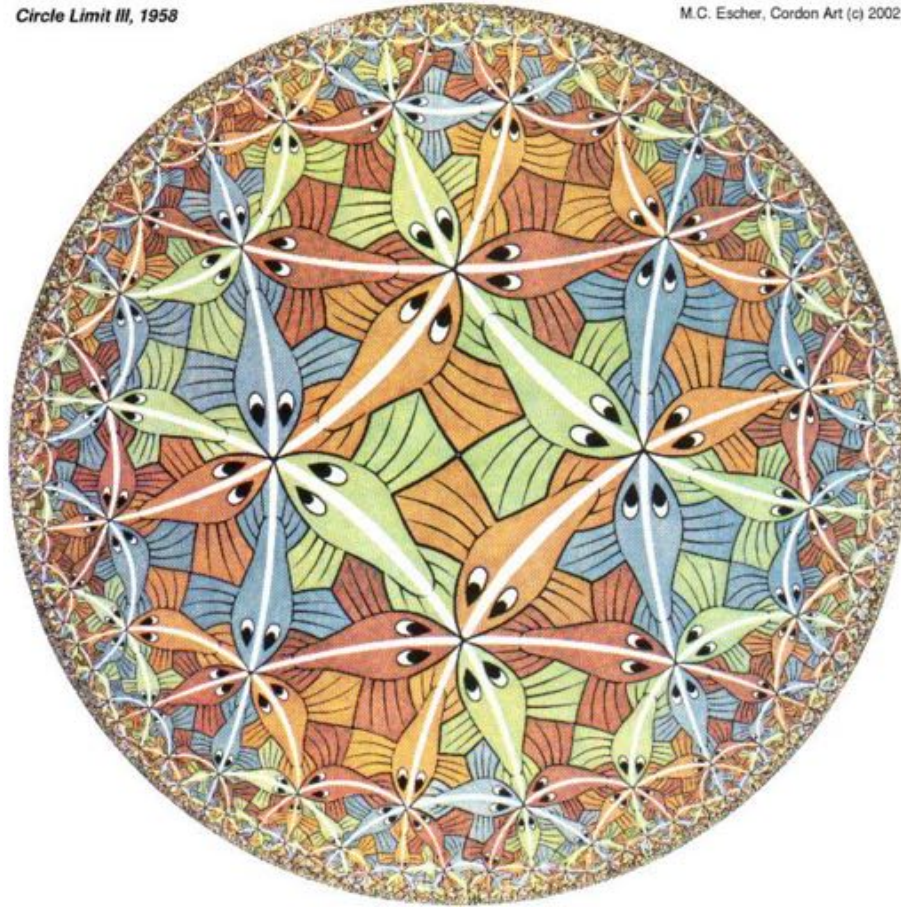
Circle Limit 1



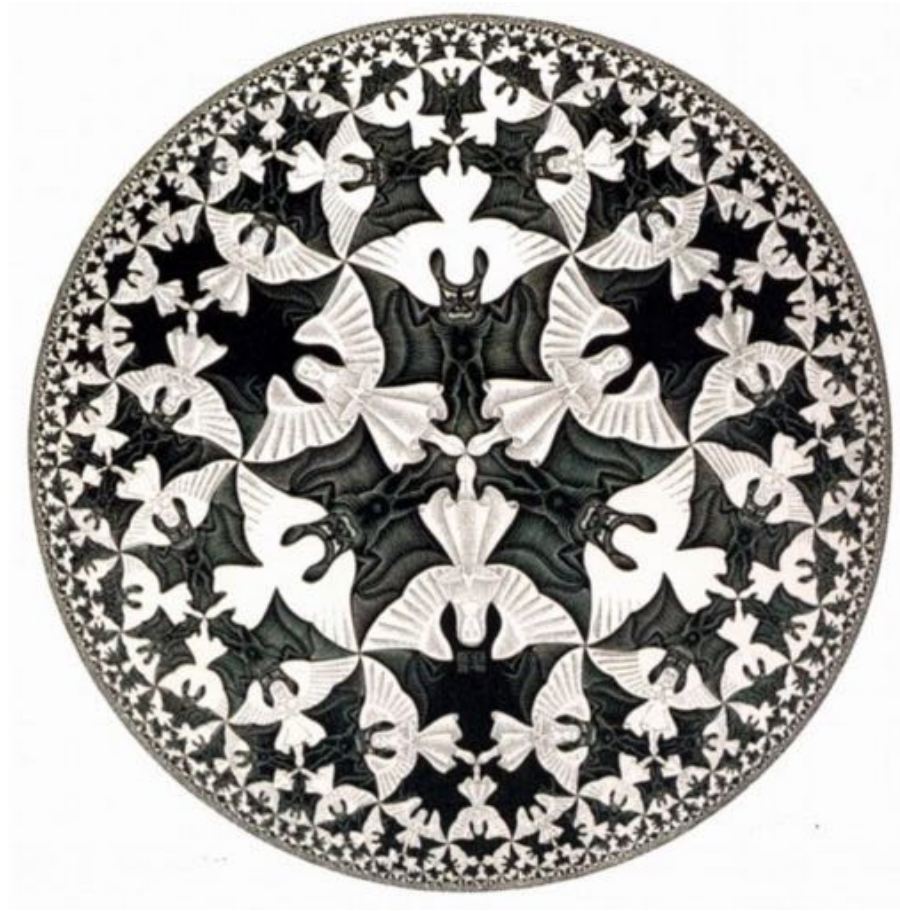
Circle Limit II

Circle Limit III, 1958

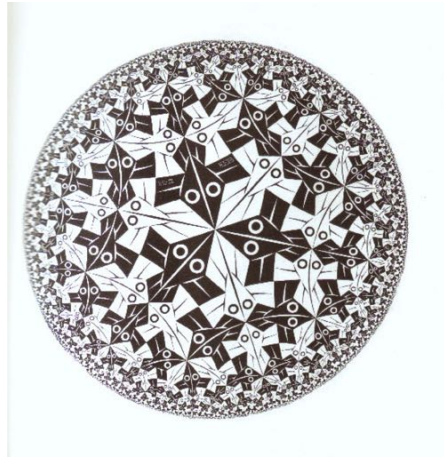
M.C. Escher, Cordon Art (c) 2002



Circle Limit III



Circle Limit IV



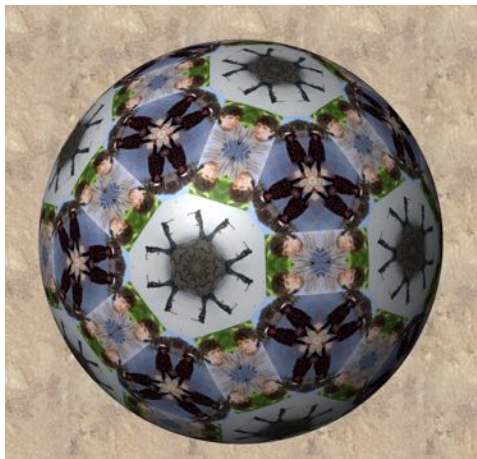
Circle Limit III, 1958

M.C. Escher, Cordon Art (c) 2002



Practice Problems

1. Find the signatures of Escher's four Circle Limit Patterns. Specify if you are ignoring color or paying attention to color.
2. Use Jeff Week's external link: Kaleidotile software to make spherical and hyperbolic patterns and post two patterns on the Padlet. Label each pattern with its signature. Note: to get patterns without mirror symmetry (e.g. 732 not *732) you can toggle View > Show Reflected Image. Note: in addition to using the available motifs, you can upload your own photos or any other pictures, by copying the picture and then clicking on the tiny yellow clipboard symbol.



3. Play with Jeff Weeks' Hyperbolic Games, or Hypersweeper, or Hyperrogue.