

## Escher's Representation of Hyperbolic Geometry/Saddle Geometry



*Circle Limit 4: Heaven and Hell* by M.C. Escher, 1960

1. Pick an angel and label the tip of the angel's feet, and the two tips of her wings.
2. We can figure out the angle at each of these three points by taking  $360^\circ$  and dividing by the total number of angels and demons that meet at that point, since each creature is supposed to take an equal amount of angle, fitting into  $360^\circ$ . For example, first check that at the feet there are 6 angels and demons coming into that point. So the angle at that point is  $\frac{360^\circ}{6} = ?$
3. A different number of creatures come in at each one the wingtips—how many creatures at a wingtip?
4. What is the angle at each of her wingtips? Compute  $\frac{360}{\text{number of creatures coming in}}^\circ =$
5. What is the sum of the three angles (one at the feet and two at the wingtips)?
6. Lines should preserve symmetry, so they should cut creatures in half (like mirror reflections) and go through the middle of the head, body, and feet. Use this idea to draw some "lines" in this space. Start by drawing mirror "lines" through the center of an angel that cuts her in half and continue these mirrors in both directions through other creatures. Draw at least five "lines" in the work, with at least 2 going through curvy angels and curvy demons.