Spherical Geometry Homework; Part 2

Due Monday November 9.
Read Spherical Geometry online (the Escher Wiki).

1. Give a definition for the defect of a triangle on the sphere. How do we compute the area of the triangle if we know what the defect is?

2.. Give a definition for the defect of a square on the sphere. What is the defect of a general n-gon? How do we compute the area of an n-gon??

3. For spherical triangles, fill in the empty (lettered) places in this table:

Angles	Defect	Area Fraction
90° 90° 90°	a:	b:
120° 80° 70°	c:	d:
72° 72° 72°	e:	f:
90° 45° g:	45°	h:
135° 135° i:	j:	1/4

4. What is the upper limit for the defect of a triangle on the sphere? Hint 1: a really "big" triangle looks like the outside of a small triangle. Hint 2: What fraction of the sphere could it cover?

5. What is the upper limit for the defect of a spherical polygon with n sides?

6. Find a formula relating the angles of a biangle to the fraction of the sphere covered by the biangle.

7. Consider the sphere on page 246 of Visions of Symmetry; determine the corner angles of the rhombus on the sphere. Remember, you can do this by deciding how many fit together to make 360° at a vertex.