Space: Its Light, Its Shape. Chapter 9: The Sphere

Assignment: For Monday, February 14, 2005

- Read Chapter 9.
- Though everyone is responsible for reading all of the material and for working out all of the exercises, teams have been assigned specific material and exercises for which they are responsible in class presentations. You may want to come to class early to firm up and smooth out the exercises with your teammates.

Team 2: What is Mr. Puncto's claim about Flatland? What does the author conclude from that?

Team 3: Define a spherical triangle. What must be true about Euclidean triangles and what must be true about spherical triangles in order for his conclusion to be valid given the existing data?

Team 4: Show how to covert from degrees to radians and from radians to degrees.

Team 1: Present Exercise 9.1.

Team 2: Show how you determined (without just reading it in the book) the formula relating a spherical triangle's areas to the sum of its angles.

Team 3: Present Exercise 9.2.

Team 4: As a warm-up to the proof the the formula for area of a spherical triangle, describe and illustrate what a "double lune" is and how to compute its area.

Team 1: Using "double lunes" describe and illustrate how to compute the area of the spherical triangle.

Team 2: Present Exercise 9.3.

Team 3: Present Exercise 9.4 (without bonus question)

Team 4: Present Exercise 9.4 Bonus question with a discussion of what we mean by significant digits.

Team 1: Present Exercise 9.5.

Team 2: Describe how a circle on a sphere can have a smaller circumference and enclose less area than a circle of the same radius in a plane. (How do we define a circle on a sphere?)

Team 3: Describe how on a sphere a circle's circumference can actually shrink even though the circle's (intrinsically measured) radius is increasing.