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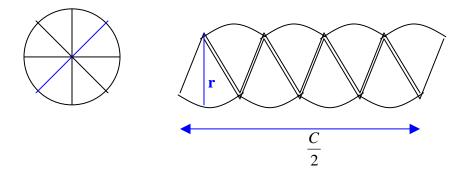margaritisaki@hotmail.com

Circles: Circumference and Area

NCTM Principles and Standards:
- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
    - Analyze properties and determine attributes of two- and three dimensional objects
    - Explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them.
    - Establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others;

Geometry Key Topics: Circles, circumference of circle, diameter, pi, perimeter of a regular polygon, area of a circle, area of a regular polygon.

Materials: TI-89. Flash application: Cabri Geometry. (available for download from www.eduation.ti.com)

Focus: The idea of perimeter can be applied not only to polygons but to circles as well. The same idea can be said for the area of a circle. In trying to see the relationship that exists between the area of a polygon and a circle imagine a circle that has been cut into triangles and placed in a regular fashion, one next to the other. Use the following diagram to help the students see that a circle is really a regular polygons with an infinite amount of sides.

If you can imagine the radius being the equivalent of height in parallelogram then the circumference would be half the perimeter of the circle or half the circumference.

Ask the students:
- What happens as we divide the circle into more and more pieces? How will the parallelogram we form look?
- What is the formula for the area of a parallelogram?
- If you were to replace $\dfrac{C}{2}$ in place of length since the length of the parallelogram is only half of a circle, and r in place of height what will your equation look like for the area of a circle?
- What is another way of writing (C) for circumference. Help the students see that $2\pi r$ is the same as the perimeter of a circle or the circumference.

Introduction: In your study of the circle you will be looking at its circumference as well as the derivation of is area formula.

Procedure: The students will be using Cabri Geometry on the TI-89 as they perform their investigations in this lesson.

Objectives: The student should:

- Be able to express the circumference formula and understand its relationship to the perimeter of regular polygons.
- Be able to compute the circumference of a circle
- Be able to express the area formula for circles and understand its relationship to the area of regular polygons.
- Be able to compute the area of circles.