

Title of Book: Sir Cumference and the Isle of Immeter

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Grade Levels for Recommended Use: Seventh and Eighth

7.9) Measurement. The student solves application problems involving estimation and measurement. The student is expected to:

(A) estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes.

Brief Summary: Young Per visits her uncle Sir Cumference and her aunt Lady Di of Ameter. They teach her a new game which has a hidden message. Per and her cousin Radius set sail for the Isle of Immeter.

Suggested Activity:

1. Divide a paper plate into fourths. Note that one-quarter of the circle is contained in a square whose side has a length that is equal to the radius of the circle. The area of one-quarter of the circle with radius is less than the radius times itself, or r^2 . Thus the area of the whole circle is less than $4 \times r^2$.
2. Now cut the paper plate into 16 pie-shaped sectors. Place these 16 sectors into an arrangement with 8 pointing down, and 8 inside them, pointing up to form a figure whose shape is close to that of a parallelogram.
3. The length of the base of the parallelogram-like figure is one-half the circumference (C) of the circle.
The height of the figure is the radius (r) of the circle.
The area of a parallelogram is base \times height.
Circumference = $2 \pi r$.
Area of the circle = $\frac{1}{2} C \cdot r = \frac{1}{2} (2 \pi r) r = \pi r^2$.

Students who can use the relationship between the shape of the "parallelogram" and its area and the circumference of the circle to develop the formula for the area of the circle are demonstrating plausible and deductive reasoning.

National Council of Teachers of Mathematics. (1989) *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA. p. 221.

Adapted by Dr. Faye Bruun (2012)