

36.

Area of a Circle

Objective: To determine the formula for the area of a circle.

Prerequisite

Skills: Familiarity with the area of a rectangle; the terms radius, circumference, diameter, semi-circle; the formula $C = \pi d$

Materials: Colored poster board, glue, scissors

Procedure: Give each student a circle, on which the centre should be clearly marked. Have students:

1. Draw a diameter. Mark the 2 radii on the diameter, and mark one-half the circumference ($\frac{C}{2}$) on each semi-circle.
2. Cut along the diameter. Put the two semi-circular regions together so that the edges coincide.
3. Beginning at the centre each time, cut along many radii, coming very close to the edge of the circular region but not cutting the edge. This results in a string of pie-shaped wedges (about 10).
4. Paste 1 string of pie-shaped wedges on a different piece of colored paper to suggest a rectangular region. Note that one-half of the rectangular region is covered with the semi-circular region.
5. Paste the second string of pie-shaped wedges on the first so that the entire rectangular region is covered and the wedges are not overlapping.

Since the circular region has now been adapted to a rectangular region, it is possible to estimate the area of a circle. The area of the circular region is one-half the circumference times the radius.

The formula for the area of a circular region is:

$$\text{Area} = \frac{1}{2} \times C \times r$$

$$C = 2\pi r$$

$$A = \frac{1}{2} \times 2\pi r \times r$$

$$A = \pi r^2$$

