♦ Calculator Key-In

If a regular polygon with n sides is inscribed in a circle with radius 1, then its perimeter and area are given by the formulas derived in Exercise 22 on the preceding page.

$$\text{Perimeter} = 2n \cdot \sin\left(\frac{180}{n}\right)^\circ \qquad \text{Area} = n \cdot \sin\left(\frac{180}{n}\right)^\circ \cdot \cos\left(\frac{180}{n}\right)^\circ$$

Exercises

1. Use the formulas and a calculator to complete the table at the right.
2. Use your answers in Exercise 1 to suggest approximations to the perimeter and the area of a *circle* with radius 1.

Number of sides	Perimeter	Area
18	?	?
180	?	?
1800	?	?
18000	?	?

Circles, Similar Figures, and Geometric Probability

Objectives

1. Know and use the formulas for the circumferences and areas of circles.
2. Know and use the formulas for arc lengths and the areas of sectors of a circle.
3. Find the ratio of the areas of two triangles.
4. Understand and apply the relationships between scale factors, perimeters, and areas of similar figures.
5. Use lengths and areas to solve problems involving geometric probability.

11-5 *Circumferences and Areas of Circles*

When you think of the perimeter of a figure, you probably think of the distance around the figure. Since the word "around" is not mathematically precise, perimeter is usually defined in other ways. For example, the perimeter of a polygon is defined as the sum of the lengths of its sides. Since a circle is not a polygon, the perimeter of a circle must be defined differently.