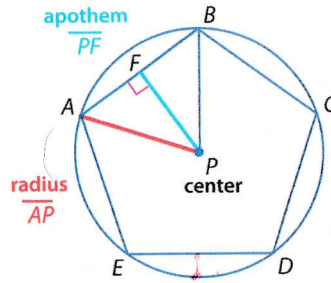


Areas of Regular Polygons

1 Areas of Regular Polygons In the figure, a regular pentagon is *inscribed* in $\odot P$, and $\odot P$ is *circumscribed* about the pentagon. The **center of a regular polygon** and the **radius of a regular polygon** are also the center and the radius of its circumscribed circle.

A segment drawn from the center of a regular polygon perpendicular to a side of the polygon is called an **apothem**. Its length is the height of an isosceles triangle that has two radii as legs.

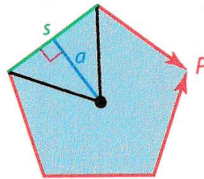


$\angle APB$ is a central angle of regular pentagon $ABCDE$.

Key Concept Area of a Regular Polygon

Words The area A of a regular n -gon with side length s is one half the product of the apothem a and perimeter P .

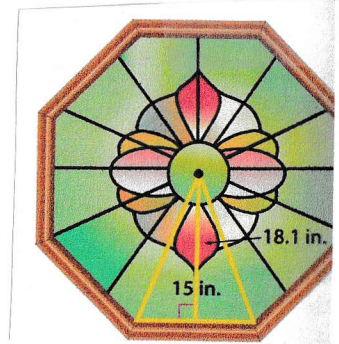
Symbols $A = \frac{1}{2}a(ns)$ or $A = \frac{1}{2}aP$.



Real-World Example 2 Area of a Regular Polygon

ART Kang created the stained glass window shown. The window is a regular octagon with a side length of 15 inches and an apothem of 18.1 inches. What is the area covered by the window?

8 sides



$$A = \frac{1}{2}Pa$$

$$a = 18.1 \text{ in}$$

$$P = 8 \cdot 15$$

$$\frac{1}{2}(8 \cdot 15)18.1$$

$$A = 1086 \text{ in}^2$$