9-2 Regular Polygons

A **regular polygon** is a polygon with all congruent sides and angles.

**Apothem** - a segment from the center of the polygon to the midpoint of a side.

**Radius** - a segment from the center to a vertex

To find the area of a regular polygon - \( A = \frac{1}{2}ap \)

where \( a = \) apothem and \( p = \) perimeter.
Finding the Area of a Regular Polygon

Find the area of each regular polygon. Round to the nearest tenth.

**A** a regular hexagon with side length 6 m

\[ A = \frac{1}{2} \cdot p \cdot a \]
\[ p = 36 \]
\[ a = 3 \sqrt{3} \approx 5.2 \]
\[ A = \frac{1}{2} \cdot 3 \sqrt{3} \cdot 36 \]
\[ = 54 \sqrt{3} \approx 93.6 \text{ m}^2 \]

**B** a regular pentagon with side length 8 in.

\[ A = \frac{1}{2} \cdot p \cdot a \]
\[ p = 8 \cdot 5 = 40 \]
\[ A = \frac{1}{2} \cdot 5.5 \cdot 40 \]
\[ = 110 \text{ in}^2 \]

\[ \tan 36^\circ = \frac{4}{x} \]
\[ 0.727 = \frac{4}{x} \]
\[ x = 5.5 \]

HW: p. 603 #14 - 31