Lesson 10.3 Areas of Regular Polygons

You can circumscribe a circle about any regular polygon. The center of a regular polygon is the center of the circumscribed circle. The radius of a regular polygon is the distance from the center to a vertex. The <u>apothem</u> is the perpendicular distance from the center to a side.



Ex. The figure below is a regular pentagon with radii and an apothem drawn. What is the measure of each numbered angle?



1 Below is a portion of a regular octagon with radii and an apothem drawn. What is the measure of <1?



2 Below is a portion of a regular octagon with radii and an apothem drawn. What is the measure of <2?



3 Below is a portion of a regular octagon with radii and an apothem drawn. What is the measure of <3?



- <u>Area of a Regular Polygon:</u> A = 1/2 ap *where a is apothem and p is perimeter
- The area formula for a regular polygon stems from the area formula for a triangle. How so?



Ex. What is the area of the regular decagon?



4 What is the area of a regular pentagon with an 8-cm apothem and 11.6-cm sides?

If the sides of a regular polygon is reduced to half its length, how does the perimeter of the polygon change?

Ex. A honeycomb is made up of regular hexagonal cells. The length of a side of a cell is 3 mm. What is the area of a cell?

5 The side of a regular hexagon is 16 ft. What is the area of the hexagon? Round to the nearest square foot.