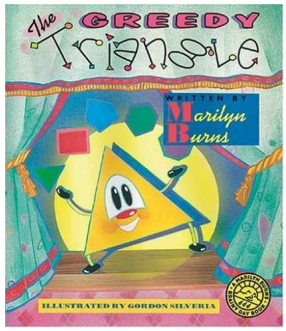
Math 7H - Unit 5

Day 9 - Area of Regular Polygons

Lesson Objectives:

- I can solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles.



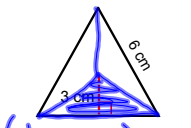
Remember that a **regular polygon** has ALL sides congruent, and also ALL angles congruent.

The **apothem** of a regular polygon is a line drawn from the very center of a polygon to the middle of one of the polygon's sides as shown above.

***Note**: The apothem always forms a right angle with any side of the polygon.

One method to find the area of a regular polygon is to partition the polygon into congruent triangles. Find the area of one triangle using the apothem as its height and the side length of the polygon as the base of the triangle. Then multiply the area by the number of congruent triangles to get the area of the polygon.

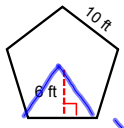
Find the area of each regular polygon.



$\left(\frac{1}{2} \cdot 6 \cdot 3\right) \cdot 3$

$(9) \cdot 3$

$A = 27\text{cm}^2$



$\left(\frac{1}{2} \cdot 10 \cdot 6\right) \cdot 5$

$30 \cdot 5$

$A = 150\text{ ft}^2$

Another method we can use to find the area of regular polygons is the following formula:

Area = (1/2) (apothem) (Perimeter)

$A = (1/2)\, a\, P$

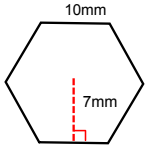
Find the area of the each regular polygons.

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

$A = \frac{1}{2}(4)(60)$

$A = \frac{1}{2}(4)(30)$

$A = 60\text{cm}^2$



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

$A = \frac{1}{2}(7)(60)$

$A = 210\text{mm}^2$

Find the missing length of the following polygons.

Heptagon: A = 147m²; apothem = 6m; P = _____m 49m

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

$147 = \frac{1}{2}(6)P$

$147 = 3P$

$49\text{m} = P$

Decagon: A = 225in²; apothem = _____in; P = 90in

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

$225 = \frac{1}{2} a \cdot 90$

$225 = 45a$

$5\text{in} = a$

Homework

Area of Regular Polygons WKS

* Individual Think Time *

What to do if you get stuck...

1. Reread the problem. Did you write it down correctly?
2. Reread your notes. Is there a problem similar that we did together in class?
3. Find a problem similar in your book. Try this one to see if it helps.
4. Skip the problem until the end of Individual Think Time. Then ask an "educated" question of a neighbor or Mrs. Call.

Today we're working by...