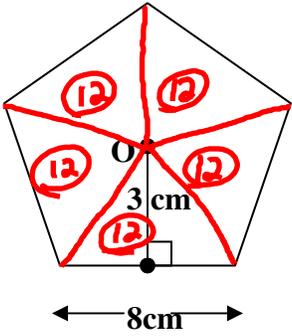# Notes for Lesson 11-4: Areas of Regular Polygons

Before beginning this section we must remind ourselves what the definition of a regular polygon is.

A regular polygon is... *a polygon where all sides & angles are ≅*

We must also remember the formula for finding the sum of the interior angles of a polygon.

The formula is... $180(n-2)$

Look at the following regular polygons. You are given information about some pieces of each and the area of the entire polygon. Use formulas that you already know (hint: try the area of a triangle) and try to find a system for finding the area of each regular polygon.
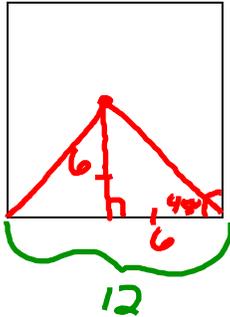
Given that O is the center of the regular polygon and its A = 60 cm^2	Given that O is the center of the regular hexagon and its A = ~~360~~ in^2 *648*
72 72 72 72 72 O 3 cm 8cm	*12 13 in* O *108* 90° *q* *x18*
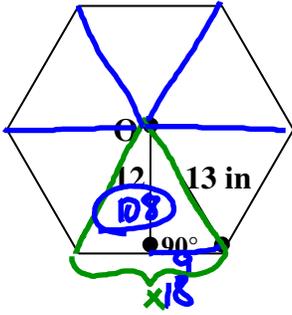
Label the apothem, center, radius, and side of the following regular polygon.

a   *r*   *h*
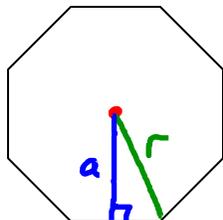
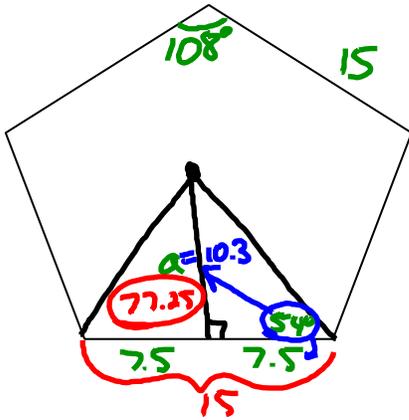Find the perimeter and area of the following.

1) A square with apothem 6.

$$P = 4 * 12 = 48 \text{ units}$$

$$A = 12 * 12 = 144 \text{ units}^2$$
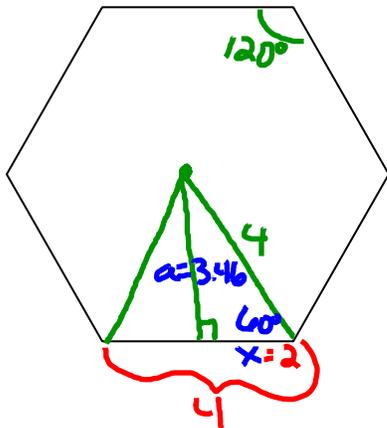
2) A pentagon with perimeter of 75.

$$\tan 54 = \frac{a}{7.5}$$

$$A_\triangle = \frac{1}{2}(15)(10.3)$$

$$A_{pent} = (77.25)(5) = 386.25 \text{ units}^2$$

3) A regular hexagon with radius 4.

$$\sin 60 = \frac{a}{4}$$

$$\cos 60 = \frac{x}{4}$$

$$A_\triangle = \frac{1}{2}(4)(3.46) = 6.92$$

$$A_{hex} = (6.92)(6) = 41.52 \text{ units}^2$$