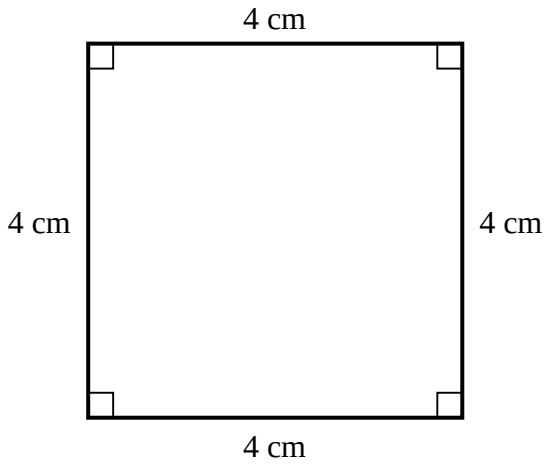
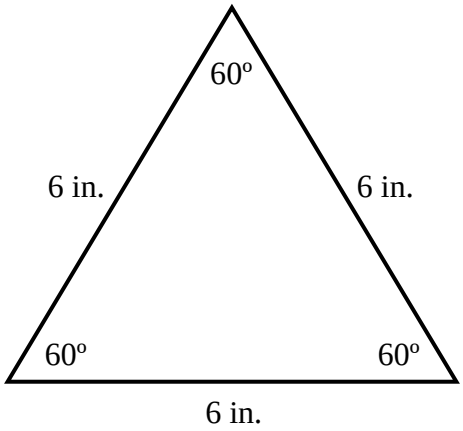
Reflections

NAME _____

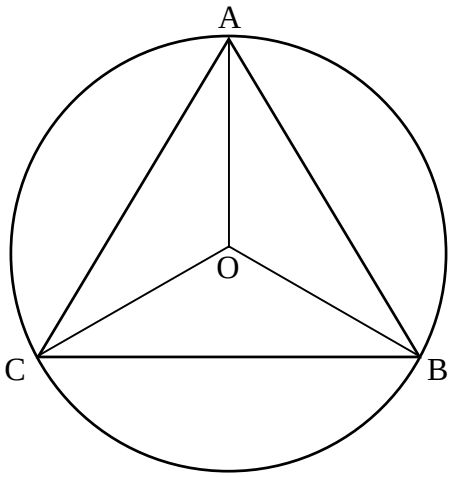
A polygon is **equiangular** if its interior angles are congruent.
A polygon is **equilateral** if its sides are congruent.
A polygon is **regular** if its sides are congruent and its interior angles are congruent.

Squares and equilateral triangles are two examples of regular polygons.





An angle formed by two rays from the center of a circle is a **central angle**. If a regular polygon is inscribed in a circle (that is, drawn so that its vertices lie on the circumference of the circle), then the central angles formed when rays are drawn from the center of the circle to the vertices are congruent. For example, the equilateral triangle below is inscribed in a circle, and a ray has been drawn from the center to each vertex. These rays divide the equilateral triangle into three congruent isosceles triangles, and the three central angles — $\angle AOB$, $\angle AOC$, and $\angle BOC$ — are congruent.



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1. Determine the measure of the central angle for a regular polygon with:

- 12 sides _____
- 18 sides _____
- 21 sides _____
- *n* sides _____

2. Find the number of sides in a regular polygon with a central angle measure of:

- 40° _____
- 20° _____
- 24° _____
- 0° _____

3. Explain how to draw each of the following figures using only a ruler and two hinged mirrors:

- Two perpendicular lines _____
- An angle with measure 120° _____
- A regular hexagon with sides 5 cm long _____

4. Determine the measure of a central angle for each of the following:

- a regular pentagon _____
- a regular octagon _____
- a regular decagon _____
- a regular *n*-gon _____

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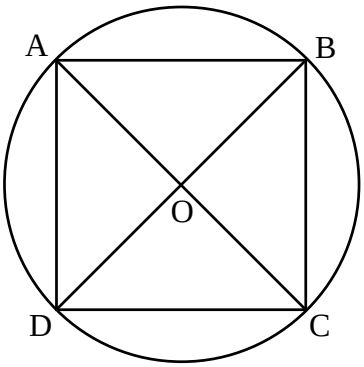
In the diagram to the right, square ABCD is inscribed in circle O. In this case, $m\angle AOB = 90°$ but $m\angle OAB = 45°$.



5. What is the $m\angle OAB$ if the inscribed polygon is…

- a regular pentagon? _____
- a regular octagon? _____
- a regular decagon? _____
- a regular *n*-gon?_____

6. Find the measure of the interior angles for each of the following:

- a regular pentagon _____
- a regular octagon _____
- a regular decagon _____
- a regular *n*-gon _____

7. Determine the sum of the measures of the interior angles for each regular polygon:

- a regular pentagon _____
- a regular octagon _____
- a regular decagon _____
- a regular *n*-gon _____

8. The central angles of a regular polygon divide the polygon into congruent isosceles triangles. Describe how you could use the area of these triangles to find the area of each of the following:

- a regular pentagon _____
- a regular octagon _____
- a regular decagon _____
- a regular *n*-gon _____

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