

Day 5 Notes Polygon Interior Angle-Sum Theorem

The sum of the measure of the interior angles of an n-gon is:

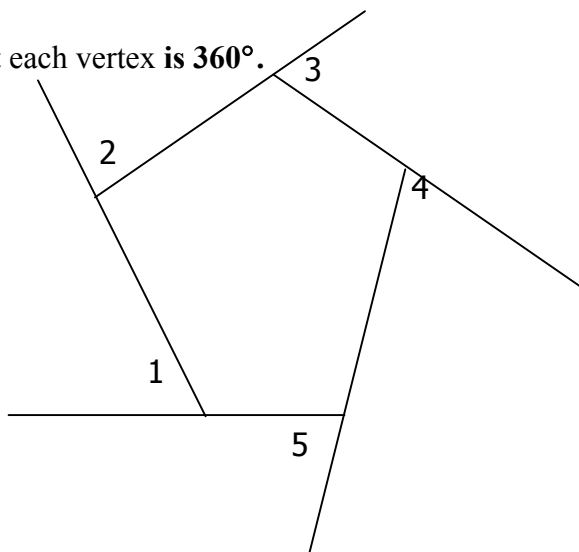
$$(n - 2) 180$$

A polygon is a closed plane figure with at least 3 sides.

Polygon Exterior Angle-Sum Theorem(6-2)

The sum of the measures of the exterior angles one at each vertex is 360° .

$$360 = m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5$$



Examples of Sums of Interiors Angles:

Shape	# of sides n	# of triangles (n - 2)	Measure of Interior angles
Triangle	3	1	180°
Quadrilateral	4	2	360°
Pentagon	5	3	540°
Hexagon	6	4	720°
Heptagon	7	5	900°
16-gon	16	14	2520°
n-gon	n	(n - 2)	(n - 2) 180°

What is the name of an 8 – sided polygon? (See page 35) Sum?

9 sides? Sum?

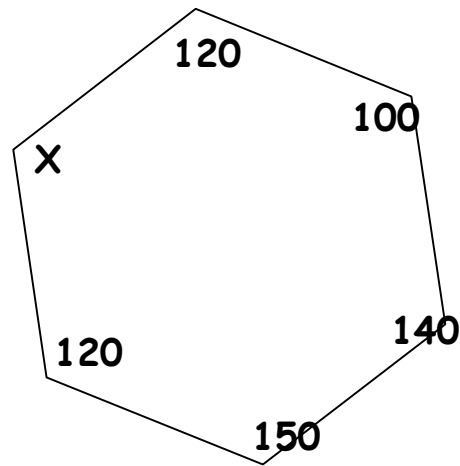
10 sides? Sum?

12 sides? Sum?

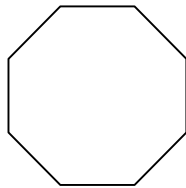
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Examples:

1. Solve for x.



2. What is the measure of **each** interior angle of a regular octagon? (hint: what does 'regular' mean?)

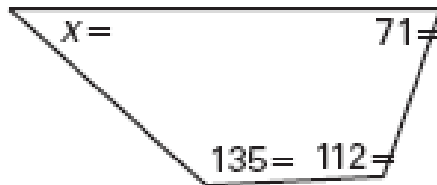


So what would be the formula to calculate each interior angle of a regular polygon?

1.

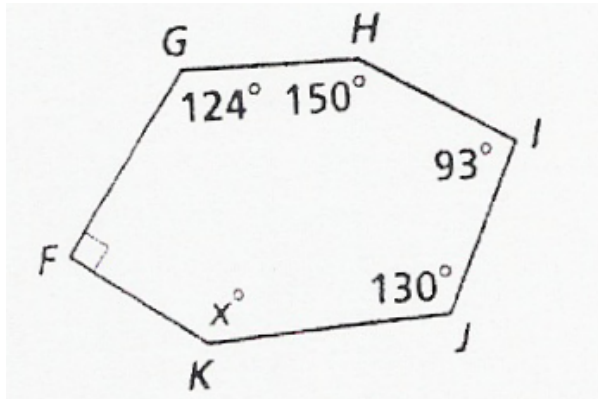
The sum of the measures of the interior angles of a convex polygon is 1260° . Classify the polygon by the number of sides.

2. Solve for x



3. **Lamps** The base of a lamp is in the shape of a regular 15-gon. Find (a) the measure of each interior angle and (b) the measure of each exterior angle.

4.



Special Right Triangle in Regular Polygons.

The formula for the area of a regular polygon is:

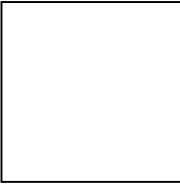
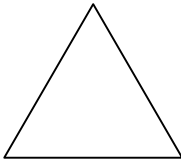
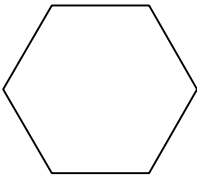
$$A = \frac{1}{2} aP$$

Where $a =$ _____ and $P =$ _____

a is the _____ and connects from the center of the polygon to the _____. It is the _____.

r is the _____ and connects from the center of the polygon to the _____ and also _____. It is the _____.

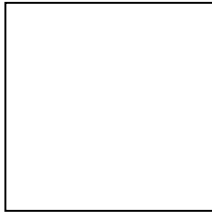
Draw the radius and apothem on each of the given regular polygons. Identify the special right triangle formed between the apothem, radius and $\frac{1}{2}$ side.

Regular Polygon	Special Right Δ	Apothem	Radius	$\frac{1}{2}$ side
				
				
				

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Given: All figures are regular polygons. Find the indicated information.

1. $a = 10\text{m}$



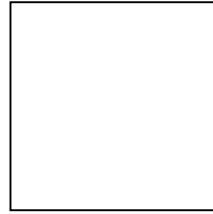
$r =$ _____

$s =$ _____

$P =$ _____

$A =$ _____

2. $r = 6\sqrt{2}$



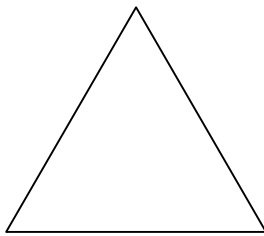
$a =$ _____

$s =$ _____

$P =$ _____

$A =$ _____

3. $r = 8\text{m}$



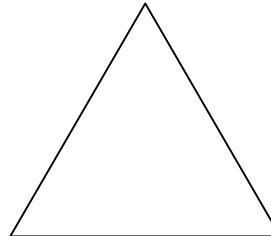
$a =$ _____

$s =$ _____

$P =$ _____

$A =$ _____

4. $P = 24\text{m}$



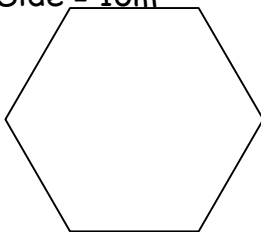
$s =$ _____

$r =$ _____

$P =$ _____

$A =$ _____

5. Side = 10m



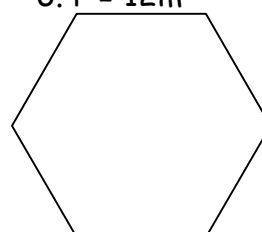
$r =$ _____

$a =$ _____

$P =$ _____

$A =$ _____

6. $r = 12\text{m}$



$s =$ _____

$a =$ _____

$P =$ _____

$A =$ _____

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Unit 6 Additional Notes: