

Name: Key

6-1 Polygon Sum Conjectures: Notes

Exterior Angle Theorem:

If a polygon is convex, then the sum of the exterior angles is

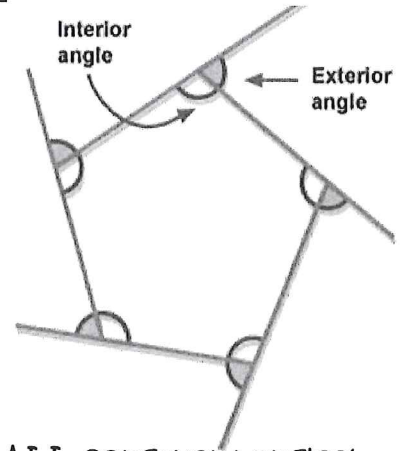
$$S = 360$$

Polygon Sum Theorem: If a convex polygon has n sides and S is the sum of its interior angles, then

$$S = (n - 2)180$$

Regular Polygon:

If a single polygon is regular, then it has ALL congruent sides and ALL congruent angles!



	Exterior Angles	Interior Angles
Sum of the angles	360°	$180(n-2)$
Each angle (or regular polygon)	$\frac{360^\circ}{n}$	$\frac{180(n-2)}{n}$

Examples:

Find the following for each polygon: (a) the sum of the measures of the interior angles and (b) the sum of the measures of the exterior angles.

1. A decagon

2. A 34-gon

a.) $180(10-2)$
 $= 1440^\circ$

a.) $180(34-2) = 5760^\circ$

b.) 360°

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	Exterior Angles	Interior Angles
Sum of the angles	360	$\frac{360}{n}$
Each angle (or regular polygon)	$(n - 2)180$	$\frac{(n - 2)180}{n}$

Find the following for each regular polygon: (a) the measure of each exterior angle, (b) the measure of each interior angle

3. A heptagon

$$a.) \frac{360}{7} = 51.4^\circ$$

$$b.) \frac{180(7-2)}{7} = 128.6^\circ$$

Plugin calculator like:
 $7 \square = 2 \square \square \times 180 \square \square \div \square 7$

4. A 16-gon

$$a.) \frac{360}{16} = 22.5^\circ$$

$$b.) \frac{180(16-2)}{16} = 157.5^\circ$$

5. A regular polygon has an exterior angle with a measure of 30° . Find the number of sides.

$$n \cdot \frac{360}{n} = 30 \cdot n$$

$$\boxed{n = 12 \text{ sides}}$$

$$\frac{360}{30} = \frac{30n}{30}$$

6. A regular polygon has 15 sides. Find the measure of each exterior angle.

$$\frac{360}{15} = 24^\circ$$