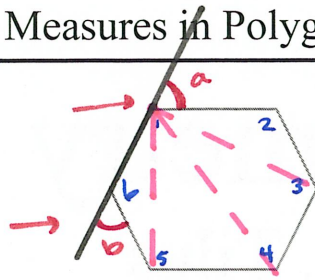


Chapter 8.1: Find Angle Measures in Polygons

Exterior Angles



Exterior and Interior angle are supplementary (Add up to 180°)

"Angle"

Consecutive Vertices: Two vertices that are endpoints of the same side.

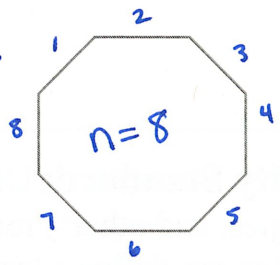
Ex. $\angle 1; \angle 2, \angle 2; \angle 3, \angle 3; \angle 4, \angle 4; \angle 5, \angle 5; \angle 6, \angle 6; \angle 1$

Interior Angles

Diagonal: a segment that connects two non-consecutive angles.

Polygon Interior Angles Theorem (Theorem 8.1): $n = \#$ of sides the shape has.

The sum of the measures of the interior angles of a convex n -gon is $(n-2)180^\circ = \text{total sum of interior angles}$.



Example: $(8-2)180^\circ = 1,080^\circ$

Interior Angles of a Quadrilateral (Corollary to Theorem 8.1):

ANY 4 sided shape

The sum of the measures of the interior angles of a quadrilateral is $360^\circ \leftarrow (4-2)180^\circ = 2(180)$

Example #1: Find the sum of measures of the interior angles of a convex hexagon. $n=6$

$$(6-2)180^\circ = 4(180) = 720^\circ$$

Example #2: The sum of the measures of the interior angles of a convex polygon is 1260°. Classify the polygon by the number of sides.

find n .

$$\frac{(n-2) \cdot 180^\circ}{180} = \frac{1,260^\circ}{180}$$

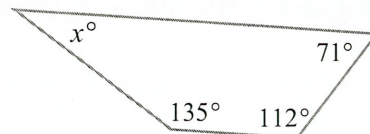
$$n-2 = 7$$

$n=9$; Nonagon

Example #3: Find the value of x in the diagram shown.

$$360^\circ - 71^\circ - 135^\circ - 112^\circ = x$$

$$42^\circ = x$$



Example #4: Find the sum of the measures of the interior angles of the convex decagon. $n=10$

$$(10-2)180^\circ = 8(180)$$

$$= 1,440^\circ$$

Example #5: Use the diagram at the right. Find $m\angle K$ and $m\angle L$.

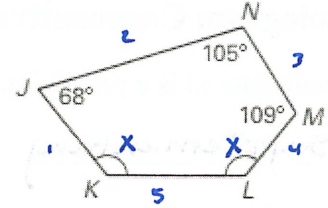
$$(5-2)180^\circ \rightarrow 540^\circ$$

$$3(180) = 540^\circ$$

$$540^\circ - 68^\circ - 105^\circ - 109^\circ = 2x$$

$$\frac{258}{2} = \frac{2x}{2}$$

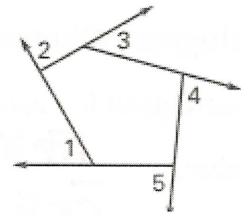
$$x = 129^\circ$$



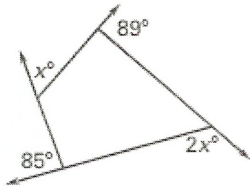
Polygon Exterior Angles Theorem (Theorem 8.2):

The sum of the measures of the exterior angles of a convex polygon, one angle at each vertex, is 360° .

ANY Shape



Example #6: Find the value of x in the diagram shown.



$$x + 89^\circ + 2x + 85^\circ = 360^\circ$$

$$3x + 174^\circ = 360^\circ$$

$$-174 \quad -174$$

$$\frac{3x}{3} = \frac{186^\circ}{3}$$

Example #7: The base of a lamp is in the shape of a regular 15-gon.

a.) Find the measure of each interior angle.

b.) Find the measure of each exterior angle.

$$\frac{(n-2)180}{n} = \text{Each interior angle}$$

(All \angle 's are \cong)

$$\frac{(15-2)180}{15} = 156^\circ$$

$$180^\circ - 156^\circ = 24^\circ > \text{Int/Ext are supp.}$$

$$\textcircled{2} \frac{360^\circ}{15} = 24^\circ$$

$$\textcircled{2} 180 - 24 = 156^\circ > \text{Int/Ext. are supp.}$$

Chapter 8.2: Use Properties of Parallelograms

Parallelogram: A quadrilateral with both pairs of opposite sides parallel

Defⁿ

Parallelogram Congruent Side Theorem (Theorem 8.3):

If a quadrilateral is a parallelogram, then its opposite sides are Congruent

$$\overline{AB} \cong \overline{CD}, \overline{AC} \cong \overline{BD}$$
