Angle Measures of Polygons

title

Classifying Polygons

4 — Quadrilateral	5 — Pentagon	6 — Hexagon
7 — Heptagon	8 — Octagon	9 — Nonagon
10 — Decagon	11 — 11-gon	12 — Dodecagon

classifying polygons

Diagonal—a segment that joins two nonconsecutive vertices of a polygon

diagonals

	Triangle	Quadrilateral	Pentagon	Hexagon
n Number of sides	3	4	5	6
Number of triangles	1	2	3	4
Sum of interior angles	180°	360°	540°	720°

$$180(n-2)$$

interior angles

Polygon Interior Angles Theorem

The sum of the measures of the interior angles of an n-gon is

$$(n-2) \cdot 180°$$

Nonagon $(9-2)180° = 1260°$

Corollary

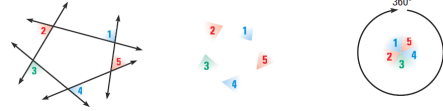The measure of each interior angle of a regular n-gon is

$$\frac{(n-2) \cdot 180°}{n}$$ $\frac{1260°}{9} = 140°$

Polygon Exterior Angles Theorem

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

Corollary

The measure of each exterior angle of a regular n-gon is

$$\frac{360°}{n}$$

interior angles

exterior angles

Find the sum of the interior angles of an 11-gon.

$(11-2)180°$
$9 \cdot 180° = 1620°$

Find the measure of an interior angle of a regular octagon.

$(8-2)180$
$6 \cdot 180 = \frac{1080}{8} = 135°$

The sum of the interior angles of a polygon is 900°. Classify the polygon by the number of sides.

$\frac{900}{180} = \frac{(n-2)180}{180}$

$5 = n-2$
$7 = n$ Heptagon

The measure of an interior angle of a regular polygon is 150°. Classify the polygon by the number of sides.

$n \cdot 150 = \frac{(n-2)180}{n} \cdot n$

$150n = (n-2)180$
$150n = 180n - 360$
$\underline{-180n \quad -180n}$
$\frac{-30n}{-30} = \frac{-360}{-30}$
$n = 12$ Dodecagon

examples

examples

Find the measure of an exterior angle of a regular quadrilateral.

$$\frac{360°}{4} = 90°$$

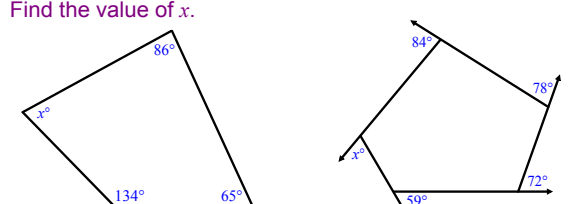The measure of an exterior angle of a regular polygon is 15°. Classify the polygon by the number of sides.

$$\frac{360}{n} = 15$$

$$\frac{360}{15} = n \qquad n = 24$$

24-gon

examples

Find the value of x.

$$x + 285 = 360$$
$$x = 75°$$

$$x + 290 = 360$$
$$x = 70°$$

examples

Conclusion

1. How do you find the sum of interior angles of a polygon? $(n-2)180$

2. How do you find each interior angle in a regular polygon? $\frac{(n-2)180}{n}$

3. What is the sum of the degrees of all exterior angles in any polygon? 360

4. Questions?????

Jan 14-10:25 AM

Assignment

Angle Measures of Polygons Wkst

Jan 14-12:17 PM