




Key

6.1 Notes – Angles of Polygons

What is the sum of the interior angles of a triangle?

Name	# of sides	# of nonoverlapping triangles	Sum of the interior angles
Triangle	3	1	$180(1)$ $1(180) = 180$
Quadrilateral 	4	2	$180(2) = 360^\circ$
Pentagon 	5	3	$180(3) = 540^\circ$
Hexagon 	6	4	$180(4) = 720^\circ$
Heptagon 	7	5	$180(7-2) = 900^\circ$
n-gon	n	n-2	$180(n-2)$

Polygon Sum of Interior Angles Theorem:

$$\text{int } \angle \text{ sum} = 180(n-2)$$

Ex1: Find the sum of the interior angles of a dodecagon. = 12 sides

$$180(12-2) = 1800^\circ$$

EX2: If the sum of the interior angles is 3240° , how many sides does the polygon have?

$$180(n-2) = 3240^\circ$$

$$\begin{array}{r} n-2 = 18 \\ +2 \quad +2 \end{array}$$

$$n = 20 \text{ sides}$$

EX3: Stop signs are regular octagons. What is the measure of ONE interior angle?

$$n=8$$

$$\frac{180(8-2)}{8} = \text{one int } \angle$$

$$\text{one } \angle = 135^\circ$$

Ex4: The measure of an interior angle of a regular polygon is 120° . Find the number of sides the regular polygon has.

$$\frac{180(n-2)}{n} = 120^\circ$$

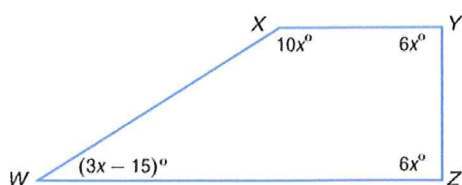
$$180n - 360 = 120n$$

$$-360 = -60n$$

$$6 \text{ sides} = n$$

Find
n

Ex5: Find the measure of each interior angle. Sides = 4 $180(4-2) = 360$



$$360 = \angle W + \angle Z + \angle Y + \angle X$$

$$360 = 3x - 15 + 6x + 6x + 10x$$

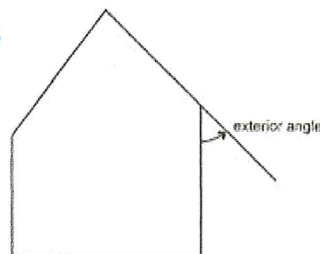
$$360 = 25x - 15$$

$$15 = x$$

$$\angle W = 30^\circ \quad \angle Z = 90^\circ \quad \angle Y = 90^\circ$$

$$\angle X = 150^\circ$$

An exterior and interior angle are Suppl.



Sum of Exterior Angles Theorem:

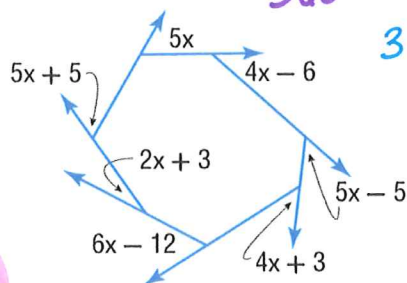
$$\text{Sum Ext } \angle = 360^\circ$$

EX5: Find the sum of the exterior angles of a hexagon.

$$360^\circ$$

EX6:

Find the value of x in the diagram.



$$360^\circ = 5x + 4x - 6 + 5x - 5 + 4x + 3 + 6x - 12 + 2x + 3 + 5x + 5$$

$$360 = 31x - 12$$

$$372 = 31x$$

$$x = 12$$

EX7: Find the measure of ONE exterior angle of a stop sign.

$$\frac{360}{8} = 45^\circ$$

EX8: How many sides does a regular polygon have if each exterior angle measures 24° ?

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

$$n = 15 \text{ sides}$$