Angles, Circles and Symmetry - Lesson 1

Angles in Polygons

LI

- Work out missing angles in regular polygons.

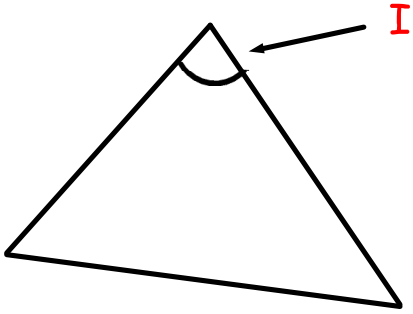
SC

- Angle properties of polygons.

Oct 26-07:57

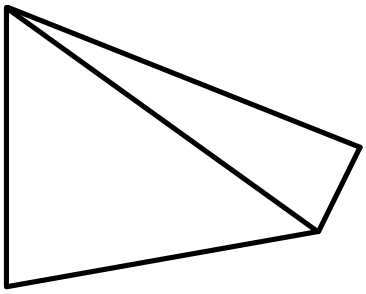
An n - gon is a polygon with n sides

n = 3 :



Sum of interior angles (S) = 180°

n = 4 :

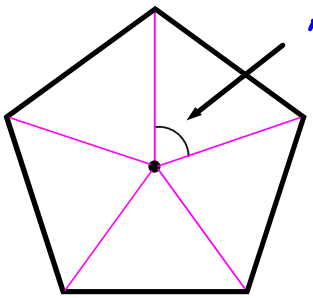


S = 360°

The sum of the interior angles of an n - gon is given by the formula :

$$S = (n - 2) \times 180^\circ$$

A regular n - gon is a polygon with n equal sides



The angle at the centre of an n - gon is :

$$\frac{360^\circ}{n}$$

Example 1

The interior angles of a polygon total to 2 340°.

How many sides does it have ?

$$S = (n - 2) \times 180°$$

$$(n - 2) \times 180° = 2\,340°$$

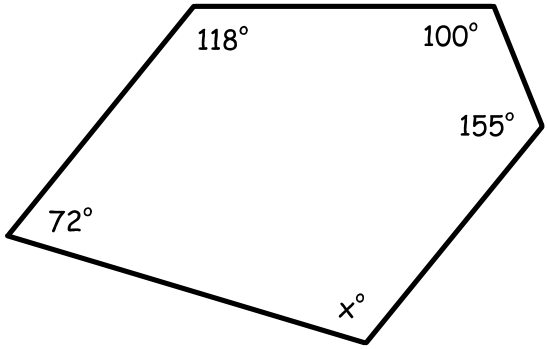
$$n - 2 = 13$$

$$n = 15$$

15 sides

Example 2

Calculate the value of x° for the following pentagon :



$S = (n - 2) \times 180^\circ$

$S = (5 - 2) \times 180^\circ$

$S = 540^\circ$

$x^\circ = 540^\circ - 118^\circ - 100^\circ - 155^\circ - 72^\circ$

$x^\circ = 95^\circ$

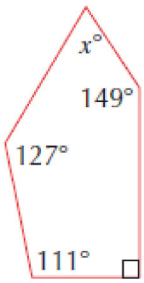
Questions

1) What is the sum of the interior angles of regular polygons with these numbers of sides?

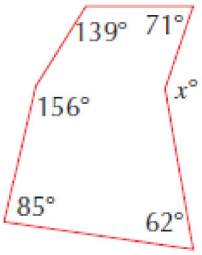
a 12 **b** 14 **c** 22

2) Calculate the size of angle $x°$ in each of the irregular polygons.

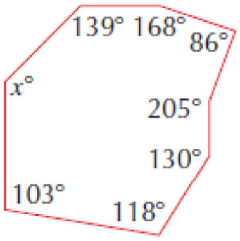
a



b



c



3) A heptagon has interior angles of 73°, 122°, 34°, 15°, 145°, 230° and $x°$. Calculate the value of x.

4) The interior angles of a polygon add up to 1260°. How many sides does it have?

5) A regular polygon has interior angles of 144°. How many sides does it have?

Dec 21-14:12

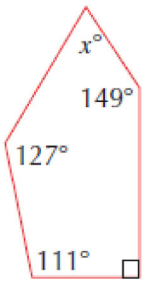
Answers

1) What is the sum of the interior angles of regular polygons with these numbers of sides?

a 12 1 800° b 14 2 160° c 22 3 600°

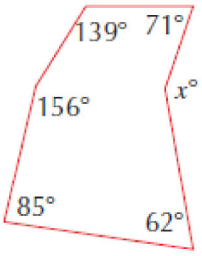
2) Calculate the size of angle $x°$ in each of the irregular polygons.

a



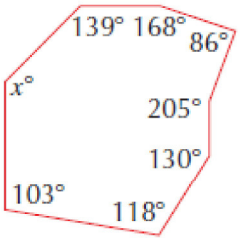
63°

b



153°

c



131°

3) A heptagon has interior angles of 73°, 122°, 34°, 15°, 145°, 230° and $x°$. Calculate the value of x. 281°

4) The interior angles of a polygon add up to 1260°. How many sides does it have? 9

5) A regular polygon has interior angles of 144°. How many sides does it have? 10