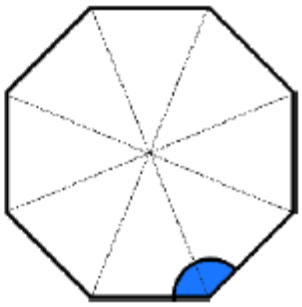
N5 Angles in a Polygon

Relationships

SPTA Mathematics – Topic Questions with Notes

You may be expected to work out angles inside other shapes, usually regular polygons (i.e. straight sided shapes where all sides and angles are the same). The key to these questions is to split the shape up into identical isosceles triangles.

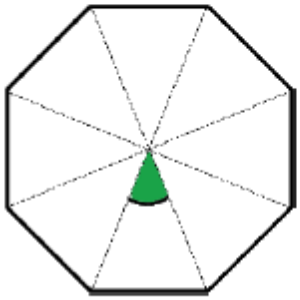


Example 2 – regular polygons

The diagram shows a regular octagon. Calculate the size of the shaded angle.

Solution

In the diagram, the octagon has been divided into eight smaller triangles. Since the octagon is regular, each triangle is the same size.



Step one – work out the angle in the centre (as pictured)

Eight equal triangles fit together to make 360°, so the shaded angle is $360 \div 8 = 45°$

Step two – we now have an isosceles triangle with one angle 45°. We now work out the other two (equal) angles.

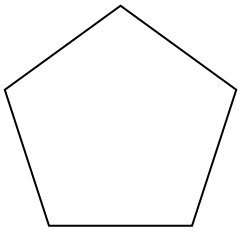
$180 - 45° = 135°$

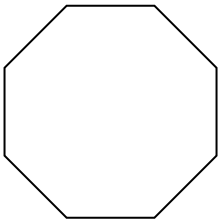
$135 \div 2 = \underline{67{\cdot}5°}$.

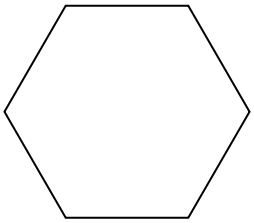
Step three – to find the shaded angle in the original diagram, we double the angle we just found. $67{\cdot}5° \times 2 = \underline{135°}$

Exercise 1

1. Each of these shapes is a REGULAR POLYGON. For each one, write down what kind of POLYGON, the size of the CENTRAL ANGLE, the INTERIOR ANGLE and the EXTERIOR ANGLE.

(a) 

(b) 

(c) 

Answers

Exercise 1

1. **(a)** pentagon; 72^o; 108^o, 72^o **(b)** octagon; 45^o; 135^o; 45^o

(c) hexagon; 60^o; 120^o; 60^o