Exercise 14A

Q1.

Answer :

Exterior angle of an n-sided polygon = $\left(\frac{360}{n}\right)^o$

(i) For a pentagon: $n = 5$

$$\therefore \left(\frac{360}{n}\right) = \left(\frac{360}{5}\right) = 72^o$$

(ii) For a hexagon: $n = 6$

$$\therefore \left(\frac{360}{n}\right) = \left(\frac{360}{6}\right) = 60^o$$

(iii) For a heptagon: $n = 7$

$$\therefore \left(\frac{360}{n}\right) = \left(\frac{360}{7}\right) = 51.43^o$$

(iv) For a decagon: $n = 10$

$$\therefore \left(\frac{360}{n}\right) = \left(\frac{360}{10}\right) = 36^o$$

(v) For a polygon of 15 sides: $n = 15$

$$\therefore \left(\frac{360}{n}\right) = \left(\frac{360}{15}\right) = 24^o$$

Q2.

Answer :

Each exterior angle of an n-sided polygon = $\left(\frac{360}{n}\right)^o$

If the exterior angle is 50°, then:

$$\frac{360}{n} = 50$$
$$\Rightarrow n = 7.2$$

Since n is not an integer, we cannot have a polygon with each exterior angle equal to 50°.

Q3.

Answer :

For a regular polygon with n sides:

$$\text{Each interior angle} = 180 - \{\text{Each exterior angle}\} = 180 - \left(\frac{360}{n}\right)$$

(i) For a polygon with 10 sides:

$$\text{Each exterior angle} = \frac{360}{10} = 36^{o}$$
$$\Rightarrow \text{Each interior angle} = 180 - 36 = 144^{o}$$

(ii) For a polygon with 15 sides:

$$\text{Each exterior angle} = \frac{360}{15} = 24^{o}$$
$$\Rightarrow \text{Each interior angle} = 180 - 24 = 156^{o}$$

Q4.

Answer :

Each interior angle of a regular polygon having n sides = $180 - \left(\frac{360}{n}\right) = \frac{180n-360}{n}$

If each interior angle of the polygon is 100°, then:

$$100 = \frac{180n-360}{n}$$
$$\Rightarrow 100n = 180n - 360$$
$$\Rightarrow 180n - 100n = 360$$
$$\Rightarrow 80n = 360$$
$$\Rightarrow n = \frac{360}{80} = 4.5$$

Since n is not an integer, it is not possible to have a regular polygon with each interior angle equal to 100°.

Q5.

Answer :

Sum of the interior angles of an n-sided polygon = $(n-2)\times 180^\circ$

(i) For a pentagon:

$n=5$

$\therefore\ (n-2)\times 180^\circ=(5-2)\times 180^\circ=3\times 180^\circ\ =\ 540^\circ$

(ii) For a hexagon:

$n=6$

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

(iii) For a nonagon:

$n=9$

$\therefore\ (n-2)\times 180^\circ=(9-2)\times 180^\circ=7\times 180^\circ\ =\ 1260^\circ$

(iv) For a polygon of 12 sides:

$n=12$

$\therefore\ (n-2)\times 180^\circ=(12-2)\times 180^\circ=10\times 180^\circ\ =\ 1800^\circ$

Q6.

Answer :

Number of diagonal in an n-sided polygon = $\frac{n(n-3)}{2}$

(i) For a heptagon:

$$n=7\Rightarrow\frac{n(n-3)}{2}=\frac{7(7-3)}{2}=\frac{28}{2}=14$$

(ii) For an octagon:

$$n=8\Rightarrow\frac{n(n-3)}{2}=\frac{8(8-3)}{2}=\frac{40}{2}=20$$

(iii) For a 12-sided polygon:

$$n=12\Rightarrow\frac{n(n-3)}{2}=\frac{12(12-3)}{2}=\frac{108}{2}=54$$

Q7.

Answer :

Sum of all the exterior angles of a regular polygon is 360^o.

(i)

$\text{Each exterior angle}=40^o$

$\text{Number of sides of the regular polygon}\ =\ \frac{360}{40}=9$

*********** END **********