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

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

(iii) For a heptagon: n=7

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

(iv) For a decagon: n=10

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

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

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

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:

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

(i) For a polygon with 10 sides:

Each exterior angle
$$=\frac{360}{10}=36^{\circ}$$

 \Rightarrow Each interior angle $=180-36=144^{\circ}$

(ii) For a polygon with 15 sides:

Each exterior angle
$$=\frac{360}{15}=24^{\circ}$$

 \Rightarrow Each interior angle $=180-24=156^{\circ}$

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:

$$\begin{array}{l} 100 \ = \frac{180n - 360}{n} \\ \Rightarrow \ 100n \ = \ 180n \ - \ 360 \\ \Rightarrow \ 180n - 100n \ = \ 360 \\ \Rightarrow \ 80n \ = \ 360 \\ \Rightarrow \ n \ = \frac{360}{80} \ = \ 4.5 \end{array}$$

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

Answer:

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

(i) For a pentagon:

$$n = 5$$

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

(ii) For a hexagon:

$$n = 6$$

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

(iii) For a nonagon:

$$n = 9$$

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

(iv) For a polygon of 12 sides:

$$n = 12$$

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

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)

Each exterior angle $= 40^{\circ}$

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

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