SpeedLabs

MATHS

ICSE 8th

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1. Each interior angle of a regular polygon is 144. Find the interior angle of a polygon, which has double the number of sides as the first polygon.

Ans. Let the number of sides of the first polygon =n

$$n = \frac{360°}{180° - \text{Interior Angle}} = \frac{360°}{180° - 144} = 10$$

Therefore the number of sides of the second polygon =20

Interior angle of the second polygon

$$= \frac{(2n - 4) \times 90°}{n} = \frac{(2 \times 20 - 4) \times 90°}{20} = 162$$

2. Two angles of a polygon are right angles and each of the other angles is 120°. Find the number of sides of the polygon.

Ans. Let the number of sides =n

Sum of Exterior Angles = 2 × 90° + (n - 2) × 60

⇒ 60+60n = 360

or n = 5

3. The angles of Septagon are in the ratio of 1:2:3:4:5:6:7:8. Find the smallest angle.

Ans. Sum of Interior Angles =(2n - 4) × times 90°= (2 ×8 – 4) × 90° = 1080°

Let the angles be 1x, 2x, 3x, 4x, 5x, 6x, 7x, 8x

Therefore 1x+ 2x+ 3x+ 4x+ 5x+ 6x+ 7x+ 8x=1080° or x = 30

Hence the angles are 30°, 60°, 90°, 120°, 150°, 180°, 210° and 240°.

The smallest angle is 30°.

4. One angle of an Octagon is 100. And all the other seven angles are equal. What is the measure of each one of the equal angles?

Ans. One angle given =100°

Let each of the equal angles = x

Sum of Interior Angles = (2n - 4) × 90° = (2 × 8 - 4) × 90° = 1080°

⇒ 100 + 7x = 1080 or x = 140°

Each of the equal angles =140°

5. Each exterior angle of a regular polygon is 22.5 . Find the number of sides of the polygon.

Ans. Interior angles = 180° - Exterior angle = 180 – 22.5 = 157.5°

No. of sides $n = \frac{360°}{180° - \text{Interior angle}} = \frac{360°}{(180° - 157.5°)} = 16$

6. The sum of all the interior angles of a regular polygon is twice the sum of exterior angles. Find the number of sides of the polygon.

Ans. Sum of Interior Angles = (2n - 4) × 90°

Sum of exterior Angles = 360°

Given Sum of Interior Angles = 2 × (Sum of exterior angles)

⇒ (2n - 4) × 90° = 720° or

n = 6

7. The ratio between the exterior angle and the interior angles is 2:7. Find the number of sides of the polygon.

Ans. Interior angles = 180° - exterior angle

Let the Exterior angle = 2x and the Interior Angle be

7x ⇒ 2x + 7x = 180 or x = 20

Therefore Interior angle = 140°

No. of sides $(n) = \frac{360°}{180° - 140°} = 9$

8. Find the number of sides of a regular polygon, if its interior angle is equal to exterior angle.

Ans. Interior angles = 180° - Exterior Angle

This means that each of the interior and the exterior angles = 90°

No. of sides $n = \frac{360°}{(180° - \text{Interior angle})} = \frac{360°}{(180° - 90°)} = 4$

9. Is it possible to have a regular polygon whose interior angles measure measures 1 3/4 of a right angle.

Ans. Yes. Let us calculate the number of sides of this polygon.

No. of Sides $n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360°}{(180° - 157.5°)} = 16$

10. Is it possible to have a regular polygon whose interior angles measure 130°

Ans. No. Let us calculate the number of sides of this polygon.

No. of Sides $n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360°}{(180° - 130°)} = 7.2$

Hence not possible.

11. Is it possible to have a polygon, the sum of whose interior angles is 14 right angles. If yes, how many sides does this polygon have?

Ans. Yes. Let us calculate the number of sides of this polygon.

No. of Sides $= \frac{1}{2}\left(\frac{\text{Sum of interior angles}}{90} + 4\right) = \frac{1}{2}\left(\frac{14\times90°}{90} + 4\right) = 9$

Hence possible.

The number of side =9

12. Is it possible to have a polygon, the sum of whose interior angles is 7 right angles.

Ans. No. Let us calculate the number of sides of this polygon.

No. of Sides $= \frac{1}{2}\left(\frac{\text{sum of interior angles}}{90} + 4\right) = \frac{1}{2}\left(\frac{7\times90°}{90} + 4\right) = 5.5$

Hence not possible.

13. Is it possible to have a polygon whose sum of interior angles is 840°.

Ans. No. Let us calculate the number of sides of this polygon.

No. of Sides $= \frac{1}{2}\left(\frac{\text{Sum of interior angles}}{90} + 4\right) = \frac{1}{2}\left(\frac{840°}{90} + 4\right)$which is not an integer.

Hence not possible

14. The sides of a hexagon are produced in order. If the measure of the exterior angles so obtained are (3x-5), (8x + 3), (7x - 2), (4x + 1), (6x + 4) and (2x - 1) . Find the value of x and the measure of each exterior angle of the hexagon.

Ans. Sum of the interior angles of hexagon = (2n - 4) × 90°

= (2 × 6 - 4) × 90° = 720°

(3x - 5) + (8x + 3) + (7x - 2) + (4x + 1) + (6x + 4) + (2x - 1)=360°

30x = 360°

x=12°

Now substitute the value of x in the expressions of all the sides we get:

(3x-5)=31°

(8x + 3)=99°

(7x - 2)=82°

(4x + 1)=49°

(6x + 4)= 76°

(2x - 1)=23°

15. Find the number of sides of a regular polygon each of whose exterior angles are:

(i) 30 (ii) 36 (iii) 40 (iv) 18

Ans. (i) Exterior angle 30

Interior angle = 180° - Exterior angle

180 – 30 = 150°

$n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360}{180-150} = 12$

(ii) Exterior angle 36

Interior angle = 180° - Exterior angle

180 – 36 = 144°

$n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360}{180-144} = 10$

(iii) Exterior angle 40

Interior angle = 180° - Exterior angle

180 – 40 = 140°

$n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360}{180-140} = 9$

(iv) Exterior angle 18

Interior angle = 180° - Exterior angle

180 – 30 = 162°

$n = \frac{360°}{(180° - \text{Interior Angle})} = \frac{360}{180-162} = 20$