

1) Three angles of a quadrilateral are respectively equal to 110^0 , 50^0 and 40^0 . Find its fourth angle.

Solution:

Given,

Three angles are 110^0 , 50^0 and 40^0

Let the fourth angle be 'x'

We have,

Sum of all angles of a quadrilateral = 360^0

$$110^0 + 50^0 + 40^0 = 360^0$$

$$\Rightarrow x = 360^0 - 200^0$$

$$\Rightarrow x = 160^0$$

Therefore, the required fourth angle is 160^0 .

2) In a quadrilateral ABCD, the angles A, B, C and D are in the ratio of 1:2:4:5. Find the measure of each angles of the quadrilateral.

Solution:

Let the angles of the quadrilaterals be

$$A = x, B = 2x, C = 4x \text{ and } D = 5x$$

Then,

$$A + B + C + D = 360^0$$

$$\Rightarrow x + 2x + 4x + 5x = 360^0$$

$$\Rightarrow 12x = 360^0$$

$$\Rightarrow x = \frac{360^0}{12}$$

$$\Rightarrow x = 30^0$$

$$\text{Therefore, } A = x = 30^0$$

$$B = 2x = 60^0$$

$$C = 4x = 120^0$$

$$D = 5x = 150^0$$

3) In a quadrilateral ABCD, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$.

Solution:

In $\triangle DOC$

$$\angle 1 + \angle COD + \angle 2 = 180^0 \quad [\text{Angle sum property of a triangle}]$$

$$\Rightarrow \angle COD = 180 - (\angle 1 + \angle 2)$$

$$\Rightarrow \angle COD = 180 - \angle 1 - \angle 2$$

$$\Rightarrow \angle COD = 180 - \left[\frac{1}{2}LC + \frac{1}{2}LD \right] \quad [\because OC \text{ and } OD \text{ are bisectors of } LC \text{ and } LD \text{ respectively}]$$

$$\Rightarrow \angle COD = 180 - \frac{1}{2}(LC + LD) \dots (i)$$

In quadrilateral ABCD

$$\angle A + \angle B + \angle C + \angle D = 360^\circ \quad [\text{Angle sum property of quadrilateral}]$$

$$\angle C + \angle D = 360^\circ - (\angle A + \angle B) \dots (ii)$$

Substituting (ii) in (i)

$$\Rightarrow \angle COD = 180 - \frac{1}{2}(360 - (\angle A + \angle B))$$

$$\Rightarrow \angle COD = 180 - 180 + \frac{1}{2}(\angle A + \angle B)$$

$$\Rightarrow \angle COD = \frac{1}{2}(\angle A + \angle B)$$

4) The angles of a quadrilateral are in the ratio 3:5:9:13. Find all the angles of the quadrilateral.

Solution:

Let the common ratio between the angles is 't'

So the angles will be 3t, 5t, 9t and 13t respectively.

Since the sum of all interior angles of a quadrilateral is 360°

$$\text{Therefore, } 3t + 5t + 9t + 13t = 360^\circ$$

$$\Rightarrow 30t = 360^\circ$$

$$\Rightarrow t = 12^\circ$$

Hence, the angles are

$$3t = 3 \times 12 = 36^\circ$$

$$5t = 5 \times 12 = 60^\circ$$

$$9t = 9 \times 12 = 108^\circ$$

$$13t = 13 \times 12 = 156^\circ$$