

**RD SHARMA**

**Solutions**

**Class 9 Maths**

**Chapter 14**

**Ex 14.1**

**1) Three angles of a quadrilateral are respectively equal to  $110^{\circ}$ ,  $50^{\circ}$  and  $40^{\circ}$ . Find its fourth angle.**

**Solution:**

Given,

Three angles are  $110^{\circ}$ ,  $50^{\circ}$  and  $40^{\circ}$

Let the fourth angle be 'x'

We have,

Sum of all angles of a quadrilateral =  $360^{\circ}$

$$110^{\circ} + 50^{\circ} + 40^{\circ} = 360^{\circ}$$

$$\Rightarrow x = 360^{\circ} - 200^{\circ}$$

$$\Rightarrow x = 160^{\circ}$$

Therefore, the required fourth angle is  $160^{\circ}$ .

**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,

$$A + B + C + D = 360^{\circ}$$

$$\Rightarrow x + 2x + 4x + 5x = 360^{\circ}$$

$$\Rightarrow 12x = 360^{\circ}$$

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

$$\Rightarrow x = 30^{\circ}$$

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

$$B = 2x = 60^{\circ}$$

$$C = 4x = 120^{\circ}$$

$$D = 5x = 150^{\circ}$$

**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  $\triangle DOC$

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

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

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

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

In quadrilateral ABCD

$$\angle A + \angle B + \angle C + \angle D = 360^0 \quad [\text{Angle sum property of quadrilateral}]$$

$$\angle C + \angle D = 360^0 - (\angle A + \angle B) \dots (ii)$$

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  $360^0$

$$\text{Therefore, } 3t + 5t + 9t + 13t = 360^0$$

$$\Rightarrow 30t = 360^0$$

$$\Rightarrow t = 12^0$$

Hence, the angles are

$$3t = 3 \times 12 = 36^0$$

$$5t = 5 \times 12 = 60^0$$

$$9t = 9 \times 12 = 108^0$$

$$13t = 13 \times 12 = 156^0$$