

Exercise 14.1

Page No: 14.4

Question 1: Three angles of a quadrilateral are respectively equal to 110° , 50° and 40° . Find its fourth angle.

Solution:

Three angles of a quadrilateral are 110° , 50° and 40°

Let the fourth angle be 'x'

We know, sum of all angles of a quadrilateral = 360°

$$110^\circ + 50^\circ + 40^\circ + x^\circ = 360^\circ$$

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

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

Therefore, the required fourth angle is 160° .

Question 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 are $A = x$, $B = 2x$, $C = 4x$ and $D = 5x$

We know, sum of all angles of a quadrilateral = 360°

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

$$x + 2x + 4x + 5x = 360^\circ$$

$$12x = 360^\circ$$

$$x = 360^\circ/12 = 30^\circ$$

Therefore,

$$A = x = 30^\circ$$

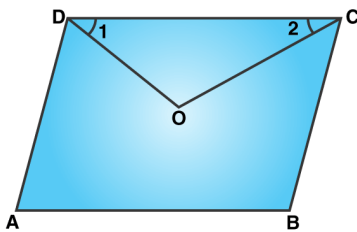
$$B = 2x = 60^\circ$$

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

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

Question 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 $\triangle DOC$,

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

$$\text{or } \frac{1}{2}\angle CDA + \angle COD + \frac{1}{2}\angle DCB = 180^\circ$$

$$\angle COD = 180^\circ - \frac{1}{2}(\angle CDA + \angle DCB) \quad \dots(i)$$

Also

We know, sum of all angles of a quadrilateral = 360°

$$\angle CDA + \angle DCB = 360^\circ - (\angle DAB + \angle CBA) \quad \dots(ii)$$

Substituting (ii) in (i)

$$\angle COD = 180^\circ - \frac{1}{2}\{360^\circ - (\angle DAB + \angle CBA)\}$$

We can also write, $\angle DAB = \angle A$ and $\angle CBA = \angle B$

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

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

Hence Proved.

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

Solution:

The angles of a quadrilateral are $3x$, $5x$, $9x$ and $13x$ respectively.

We know, sum of all interior angles of a quadrilateral = 360°

Therefore, $3x + 5x + 9x + 13x = 360^\circ$

$$30x = 360^\circ$$

$$\text{or } x = 12^\circ$$

Hence, angles measures are

$$3x = 3(12) = 36^\circ$$

$$5x = 5(12) = 60^\circ$$

$$9x = 9(12) = 108^\circ$$

$$13x = 13(12) = 156^\circ$$