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

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

=> $x = 360^0 - 200^0$

=>$x = 160^0$

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 and D = 5x

Then,

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

=> $x + 2x + 4x + 5x = 360^0$

=> $12x = 360^0$

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

=> $x = 30^0$

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 $\angle COD = \frac{1}{2}(\angle A \text{ and} \angle B)$.

Solution:

In ΔDOC

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

=> $\angle COD = 180 - (\angle 1 - \angle 2)$

=> $\angle COD = 180 - \angle 1 + \angle 2$

=> $\angle COD = 180 - [\frac{1}{2}LC + \frac{1}{2}LD]$ [∵ OC and Od are bisectors of LC and LD respectively]

=> $\angle COD = 180 - \frac{1}{2}(LC + LD) \ldots .(i)$

In quadrilateral ABCD

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

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

Substituting (ii) in (i)

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

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

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

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

Therefore, 3t + 5t + 9t + 13t = 360^0

=>30t = 360^0

=>t = 12^0

Hence, the angles are

3t = 3*12 = 36^0

5t = 5*12 = 60^0

9t = 9*12 = 108^0

13t = 13*12 = 156^0