



Pair of Linear Equations in Two variables Ex 3.11 Q22

Answer :

We know that the sum of the opposite angles of cyclic quadrilateral is 180° .in the cyclic quadrilateral $ABCD$ angles A and C and angles B and D pairs of opposite angles

Therefore

$$\angle A + \angle C = 180^\circ \text{ and } \angle B + \angle D = 180^\circ$$

$$\angle A + \angle C = 180^\circ$$

By substituting $\angle A = (4y + 20)^\circ$ and $\angle C = (-4x)^\circ$ we get

$$4y + 20 - 4x = 180^\circ$$

$$-4x + 4y + 20 = 180^\circ$$

$$-4x + 4y = 180^\circ - 20$$

$$-4x + 4y = 160^\circ$$

$$4x - 4y = -160^\circ$$

Divide both sides of equation by 4 we get

$$x - y = -40^\circ$$

$$x - y + 40^\circ = 0 \dots (i)$$

$$\angle B + \angle D = 180^\circ$$

By substituting $\angle B = (3y - 5)^\circ$ and $\angle D = (7x + 5)^\circ$ we get

$$3y - 5 + 7x + 5 = 180^\circ$$

$$7x + 3y = 180$$

$$7x + 3y - 180 = 0 \dots (ii)$$

By multiplying equation (i) by 3 we get

$$3x - 3y + 120^\circ = 0 \dots (iii)$$

By subtracting equation (iii) from (ii) we get

$$3x - 3y + 120 = 0$$

$$7x + 3y - 180 = 0$$

$$10x = 60$$

$$x = \frac{60}{10}$$

$$x = 6$$

By substituting $x = 6^\circ$ in equation (i) we get

$$x - y + 40^\circ = 0$$

$$6 - y + 40 = 0$$

$$-1y = -40 - 6$$

$$-1y = -46$$

$$y = \frac{46}{1}$$

$$y = 46$$

The angles of a cyclic quadrilateral are

$$\angle A = 4y + 20$$

$$= 4 \times 46 + 20$$

$$= 184 + 20$$

$$= 204^\circ$$

$$\angle B = 3y - 5$$

$$= 3 \times 46 - 5$$

$$= 138 - 5$$

$$= 133^\circ$$

$$\angle C = -4x^\circ$$

$$= -4(6)$$

$$= -24^\circ$$

$$\angle D = 7x + 5$$

$$= 7 \times 6 + 5$$

$$= 42 + 5$$

$$= 47^\circ$$

Hence the angles of quadrilateral are $\angle A = 204^\circ, \angle B = 133^\circ, \angle C = -24^\circ, \angle D = 47^\circ$

***** END *****