Pair of Linear Equations in Two varibles 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

$\angle A+\angle C=180°$ and $\angle B+\angle D=180°$

$\angle A+\angle C=180°$

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

$4y+20-4x=180°$

$-4x+4y+20=180°$

$-4x+4y=180°-20$

$-4x+4y=160°$

$4x-4y=-160°$

Divide both sides of equation by 4 we get

$x-y=-40°$

$x-y+40°=0\cdots(i)$

$\angle B+\angle D=180°$

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

$3y-5+7x+5=180°$

$7x+3y=180$

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

By multiplying equation (i) by 3 we get

$$3x-3y+120°=0\cdots(iii)$$

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

$$\begin{array}{r} 3x-3y+120=0 \\ 7x+3y-180=0 \\ \hline 10x=60 \end{array}$$

$$x=\frac{6\cancel{0}}{1\cancel{0}}$$

$$x=6$$

By substituting $x=6°$ in equation (i) we get

$$x-y+40°=0$$

$$6-y+40=0$$

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

$$-1y=-46$$

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

$$y=46$$

The angles of a cyclic quadrilateral are

$$\begin{aligned}\angle A &= 4y + 20 \\ &= 4 \times 46 + 20 \\ &= 184 + 20 \\ &= 204^\circ\end{aligned}$$

$$\begin{aligned}\angle B &= 3y - 5 \\ &= 3 \times 46 - 5 \\ &= 138 - 5 \\ &= 133^\circ\end{aligned}$$

$$\begin{aligned}\angle C &= -4x^\circ \\ &= -4(6) \\ &= -24^\circ\end{aligned}$$

$$\begin{aligned}\angle D &= 7x + 5 \\ &= 7 \times 6 + 5 \\ &= 42 + 5 \\ &= 47^\circ\end{aligned}$$

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

********** END **********