Exercise 16A

The opposite angles are equal in a parallelogram.

$\therefore \angle A = \angle C = x^\circ$

$\Rightarrow x + x = 130$

$\Rightarrow 2x = 130$

$\Rightarrow x = \frac{130}{2}$

$\Rightarrow x = 65$

$\therefore \angle A = 65^\circ$ *and* $\angle C = 65^\circ$

$\angle A + \angle B = 180^\circ$ [since the sum of adjacent angles of a parallelogram is 180°]

$\Rightarrow 65^\circ + \angle B = 180^\circ$

$\Rightarrow \angle B = (180 - 65)^\circ$

$\Rightarrow \angle B = 115^\circ$

$\angle D = \angle B = 115^\circ$ [opposite angles of parallelogram are equal]

Q6

Answer :

Let the lengths of two sides of the parallelogram be $5x$ cm and $3x$ cm, respectively.

Then, its perimeter $= 2(5x + 3x)$ cm

$= 16x$ cm

$\therefore 16x = 64$

$\Rightarrow x = \frac{64}{16}$

$\Rightarrow x = 4$

$\therefore$ One side $\Rightarrow (5 \times 4)$ cm $= 20$ cm

Other side $\Rightarrow (3 \times 4)$ cm $= 12$ cm

Q7

Answer :

Let the lengths of two sides of the parallelogram be x cm and $(x + 10)$ cm, respectively.

Then, its perimeter $= 2[x + (x + 10)]$ cm

$= 2[x + x + 10]$ cm

$= 2[2x + 10]$ cm

$= 4x + 20$ cm

$4x + 20 = 140$

$\Rightarrow 4x = 140 - 20$

$\Rightarrow 4x = 120$

$\Rightarrow x = \frac{120}{4}$

$\Rightarrow x = 30$

Length of one side $= 30$ cm

Length of the other side $\Rightarrow (30 + 10)$ cm $= 40$ cm

Q8

Answer :

Refer to the figure given in the book.

In $\triangle BMC$ and $\triangle DNA$:

$\angle DNA = \angle BMC = 90^\circ$

$\angle BCM = \angle DAN$ (alternate angles)

$BC = DA$ (opposite sides)

By AAS congruency criteria :

$\triangle BMC \cong \triangle DNA$

Yes, it is true that *BM is equal to DN.*

(*by* corresponding parts of congruent triangles BMC and DNA)

Q9

Refer to the figure of the book.

$\angle \mathrm{A} = \angle \mathrm{C}$ (opposite angles of a parallelogram are equal)

$\Rightarrow \frac{1}{2}\angle \mathrm{A} = \frac{1}{2}\angle \mathrm{C}$

$=> \angle \mathrm{EAD} = \angle \mathrm{FCB}$ $\left(AE \text{ and } CF \text{ bisect the angles } A \text{ and } C, \text{ respectively}\right)$

In $\triangle ADE$ and $\triangle CBF$:

$\angle B = \angle D$ (opposite angles of a parallelogram are equal)

$\angle EAD = \angle FCB$ $\left(\text{proved above}\right)$

$AD = BC$ (opposite sides of a parallelogram are equal)

By AAS concruency criteria :

$\triangle ADE \cong \triangle BCF$

$DE = BF$ $\left(\text{corresponding parts of congruent triangles}\right)$

$CD = AB$ (opposite sides of a parallelogram are equal)

Also, $CD - DE = AB - BF$

$\Rightarrow CE = AF$

$ABCD$ is a paralleleogram.

$\therefore CD \parallel AB$ $\left(\text{opposite sides of a parallelogram are parallel}\right)$

$=> CE \parallel AF$

If one pair of sides of a quadrilateral is parallel and equal, then it is a parallelogram.

Therefore, AECF is a parallelogram.

$\therefore AE \parallel CF$

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