



### Exercise 16A

The opposite angles are equal in a parallelogram.

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

$$\Rightarrow x + x = 130$$

$$\Rightarrow 2x = 130$$

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

$$\Rightarrow x = 65$$

$$\therefore \angle A = 65^\circ \text{ and } \angle C = 65^\circ$$

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

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

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

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

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

Q6

Answer :

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

$$\begin{aligned} \text{Then, its perimeter} &= 2(5x + 3x) \text{ cm} \\ &= 16x \text{ cm} \end{aligned}$$

$$\therefore 16x = 64$$

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

$$\Rightarrow x = 4$$

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

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

Q7

Answer :

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

$$\text{Then, its perimeter} = 2[x + (x + 10)] \text{ cm}$$

$$= 2[x + x + 10] \text{ cm}$$

$$= 2[2x + 10] \text{ cm}$$

$$= 4x + 20 \text{ cm}$$

$$4x + 20 = 140$$

$$\Rightarrow 4x = 140 - 20$$

$$\Rightarrow 4x = 120$$

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

$$\Rightarrow x = 30$$

$$\text{Length of one side} = 30 \text{ cm}$$

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

Q8

Answer :

Refer to the figure given in the book.

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

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

$$\angle BCM = \angle DAN \quad (\text{alternate angles})$$

$$BC = DA \quad (\text{opposite sides})$$

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.

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

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

$$\Rightarrow \angle EAD = \angle FCB \quad (AE \text{ and } CF \text{ bisect the angles } A \text{ and } C, \text{ respectively})$$

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

$$\angle B = \angle D \quad (\text{opposite angles of a parallelogram are equal})$$

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

$$AD = BC \quad (\text{opposite sides of a parallelogram are equal})$$

By AAS congruency criteria:

$$\triangle ADE \cong \triangle CBF$$

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

$$CD = AB \quad (\text{opposite sides of a parallelogram are equal})$$

$$\text{Also, } CD - DE = AB - BF$$

$$\Rightarrow CE = AF$$

$ABCD$  is a parallelogram.

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

$$\Rightarrow CE \parallel AF$$

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 \*\*\*\*\*