

General instructions for Students: Whatever be the notes provided, everything must be copied in the Maths copy and then do the HOMEWORK in the same copy.

Properties of parallelogram :

- (i) **Opposite sides of a parallelogram are equal.**
- (ii) **Opposite angles of a parallelogram are equal.**
- (iii) **Diagonals of a parallelogram bisect each other.**
- (iv) **Diagonals of a rectangle are equal and bisect each other.**
- (v) **Diagonals of a rhombus bisect each other at right angles.**
- (vi) **Diagonals of a square are equal and bisect each other at right angles.**

***** EXERCISE – 13.2 *****

3. Two adjacent sides of a parallelogram are in the ratio 5 : 7 .

If the perimeter of parallelogram is 72 cm , find the length of its sides.

Solution : Let 5x and 7x are two adjacent sides of a || gram .

[Opposite sides of a || gram are equal]

The perimeter of a || gram = 72 cm

$$5x + 7x + 5x + 7x = 72$$

$$\Rightarrow 24x = 72$$

$$\Rightarrow x = 3$$

$AB = 5x = 5 \times 3 = 15 \text{ cm} = CD$ **Ans.**

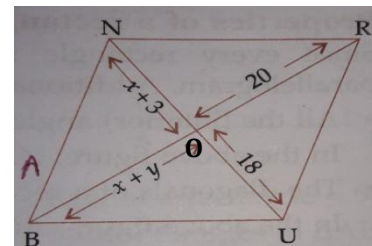
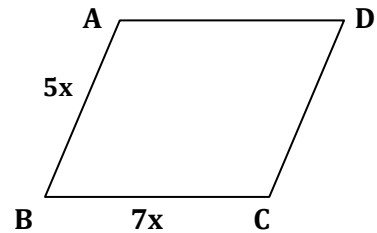
$BC = 7x = 7 \times 3 = 21 \text{ cm} = AD$ **Ans.**

7 (ii) Find the measures of x and y.

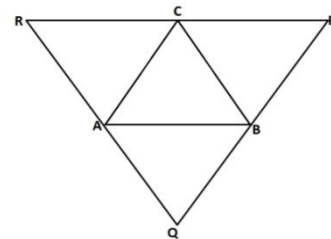
Solution : [Diagonals of a parallelogram bisect each other]

$$ON = OU \Rightarrow x + 3 = 18 \Rightarrow x = 18 - 3 = 15 \text{ cm} \quad \text{Ans.}$$

and $OB = OR \Rightarrow x + y = 20 \Rightarrow 15 + y = 20 \Rightarrow y = 20 - 15 = 5 \text{ cm} \quad \text{Ans.}$



11. In the adjoining figure, ABC is a triangle. Through A, B and C lines are drawn parallel to BC, CA and AB respectively, which forms a ΔPQR .



Show that $2(AB + BC + CA) = PQ + QR + RP$

Solution: Since, AQBC and ABCR are parallelograms

Therefore, $AQ = BC$ and $AR = BC \Rightarrow AQ = AR$

i. e. A is the mid – point of QR

Similarly, B and C are mid – points of PQ and RP respectively

$$\therefore AB = \frac{1}{2} RP, BC = \frac{1}{2} QR \text{ and } AC = \frac{1}{2} PQ$$

$$\text{Now, } AB + BC + AC = \frac{1}{2} (PQ + QR + RP)$$

$$\Rightarrow 2(AB + BC + CA) = PQ + QR + RP \quad \text{Proved.}$$

HOMEWORK

EXERCISE – 13.2

QUESTION NUMBERS : 1, 2(ii), (iii), (iv); 4, 7(i), 9 and 10

***** EXERCISE – 13.3 *****

5. In the adjoining figure, ABCD is a rhombus, find the values of x, y and z.

Solution: [Diagonals of a rhombus bisect each other at right angles]

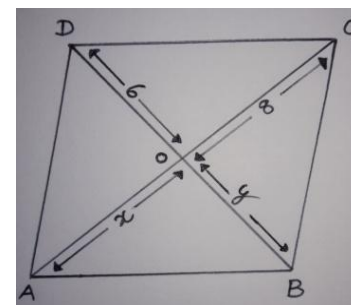
$$OA = OC \Rightarrow x = 8 \quad \text{Ans.}$$

$$\text{and } OB = OD \Rightarrow y = 6 \quad \text{Ans.}$$

$$\text{Now, } z^2 = x^2 + y^2$$

$$\Rightarrow z^2 = 8^2 + 6^2 = 64 + 36 = 100$$

$$\Rightarrow z = \sqrt{100} = 10 \quad \text{Ans.}$$



8. In the adjoining figure, ABCD is a rectangle and diagonals intersect at O. If $\angle AOB = 118^\circ$,

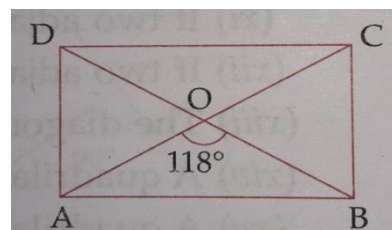
find (i) $\angle ABO$ (ii) $\angle ADO$ (iii) $\angle OCB$

Solution: Diagonals of a rectangle are equal and bisect each other

$$\text{i. e, } AC = BD \Rightarrow \frac{AC}{2} = \frac{BD}{2}$$

$$\Rightarrow OA = OB$$

$$\therefore \angle OAB = \angle ABO \quad [\text{Angles opp. to equal sides are equal}]$$



In $\triangle AOB$, $\angle OAB + \angle ABO + \angle AOB = 180^\circ$ [Angle sum prop. of a triangle]

$$\Rightarrow \angle ABO + \angle ABO + 118^\circ = 180^\circ \quad [\angle AOB = 118^\circ]$$

$$\Rightarrow 2 \angle ABO = 180^\circ - 118^\circ = 62^\circ$$

$$\Rightarrow \angle ABO = 31^\circ \text{ Ans.}$$

In $\triangle ABD$, $\angle ADB + \angle ABD + \angle BAD = 180^\circ$ [Angle sum prop. of a triangle]

$$\Rightarrow \angle ADB + 31^\circ + 90^\circ = 180^\circ \quad [\angle ABD = \angle ABO = 31^\circ]$$

$$\Rightarrow \angle ADB = 180^\circ - 121^\circ = 59^\circ = \angle ADO \quad \text{Ans.}$$

In $\triangle ABC$, $\angle ACB + \angle ABC + \angle BAC = 180^\circ$ [Angle sum prop. of a triangle]

$$\Rightarrow \angle ACB + 90^\circ + 31^\circ = 180^\circ \quad [\angle BAC = \angle OAB = 31^\circ]$$

$$\Rightarrow \angle ACB = 180^\circ - 121^\circ = 59^\circ = \angle OCB \quad \text{Ans.}$$

HOMEWORK

EXERCISE – 13.3

QUESTION NUMBERS: 1, 2, 3 and 9
