

Q.1 Which of the following statements are true for a rhombus?

- (i) It has two pairs of parallel sides.
- (ii) It has two pairs of equal sides.
- (iii) It has only two pairs of equal sides.
- (iv) Two of its angles are at right angles.
- (v) Its diagonals bisect each other at right angles.
- (vi) Its diagonals are equal and perpendicular.
- (vii) It has all its sides of equal lengths.
- (viii) It is a parallelogram.
- (ix) It is a quadrilateral.
- (x) It can be a square.
- (xi) It is a square.

Solution. (i) True (ii) True (iii) False (iv) False

(v) True (vi) False (vii) True (viii) True

(ix) True (x) True (xi) False

Q.2 Fill in the blanks, in each of the following, so as to make the statement true.

- (i) A rhombus is a parallelogram in which
- (ii) A square is a rhombus in which
- (iii) A rhombus has all its sides of length.
- (iv) The diagonals of a rhombus each other at angles.
- (v) If the diagonals of a parallelogram bisect each other at right angles, then it is a

Solution (i) adjacent sides are equal

(ii) one angle is right angle.

(iii) equal

(iv) bisect, right

(v) rhombus.

Q.3 The diagonals of a parallelogram are not perpendicular. Is it a rhombus. why or why not?

Sol: No, it is not a rhombus as diagonals of rhombus must be perpendicular.

Q.4 The diagonals of a quadrilateral are perpendicular to each other. Is such a quadrilateral always a rhombus. If your answer is 'No'. Draw a figure to justify your answer.

Sol: No, It is not always a rhombus, as the diagonals of square also perpendicular to each other.

Q.5 ABCD is a rhombus, If $\angle ACB = 40^\circ$, find $\angle ADB$.

Sol: $\therefore$ diagonals bisect at 90°

$$\therefore \angle BOC = 90^\circ$$

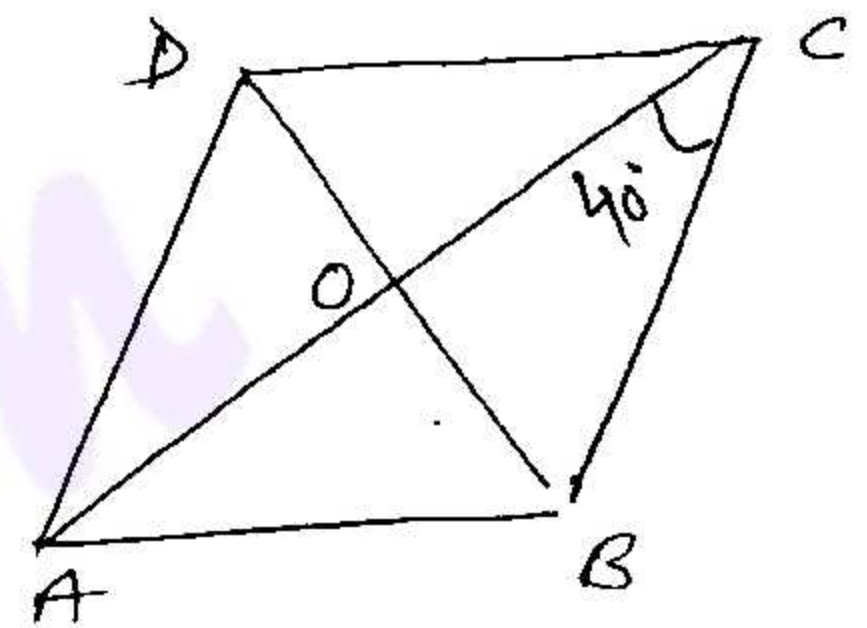
In $\triangle BOC$

$$\angle CBO + \angle BOC + \angle OBC = 180^\circ$$

$$\Rightarrow \angle CBO + 90 + 40 = 180$$

$$\Rightarrow \angle CBO = 180^\circ - 130^\circ = 50^\circ$$

$$\therefore \angle ADB = \angle CBO = 50^\circ \text{ (alternate interior angles)}$$

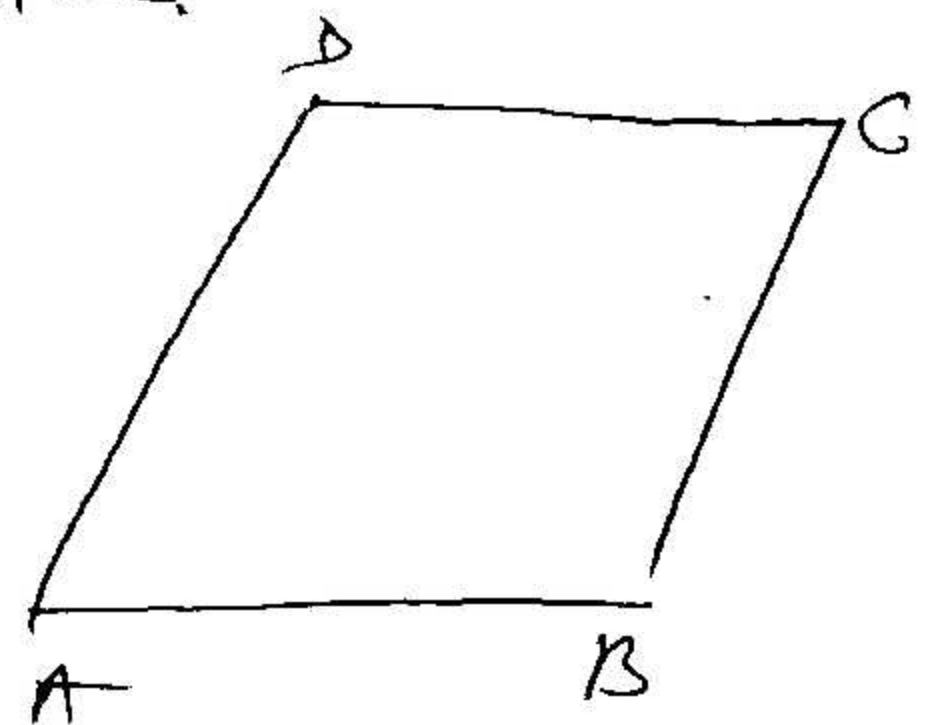


Q.6 If the diagonals of rhombus are 12cm and 16cm. Find the length of each side.

Sol: here $d_1 = 12\text{cm}$, $d_2 = 16\text{cm}$

$$\text{side} = \frac{1}{2} \sqrt{d_1^2 + d_2^2}$$

$$= \frac{1}{2} \sqrt{(12)^2 + (16)^2}$$



$$= \frac{1}{2} \sqrt{144 + 256} = \frac{1}{2} \sqrt{400} = \frac{1}{2} \times 20$$

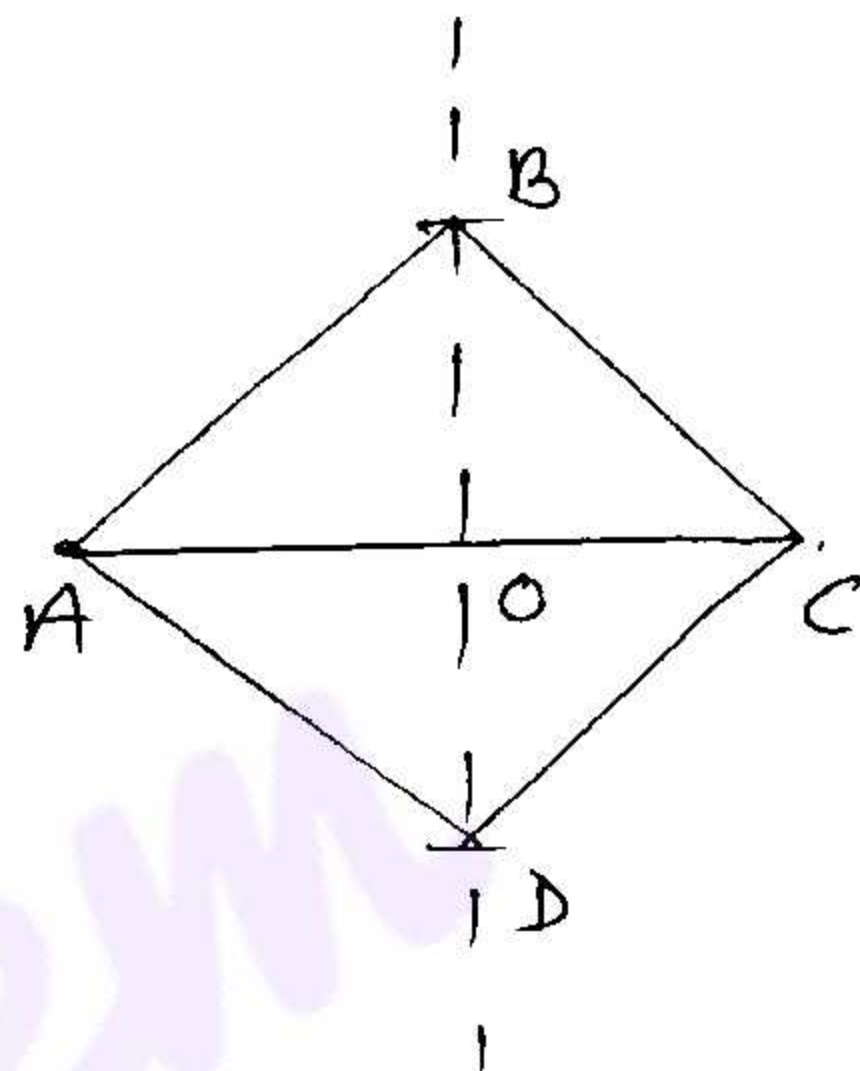
$$= 10 \text{ cm}$$

$\therefore$ length of each side = 10 cm

Q7 Construct a rhombus whose diagonals are of length 10 cm and 6 cm

Sol.

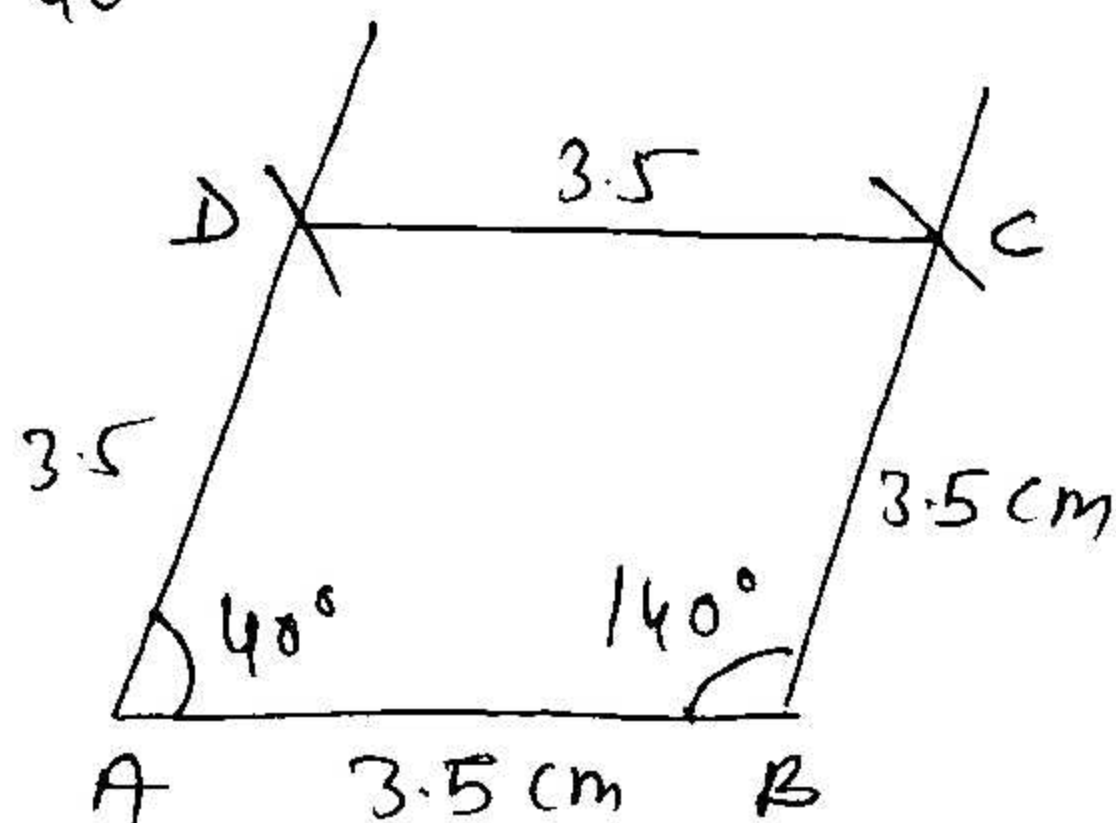
- (i) Draw a diagonal $AC = 10 \text{ cm}$.
- (ii) Draw perpendicular bisector of AC which meet AC at O .
- (iii) Taking O as centre cut arcs of $\frac{1}{2} \times 6 = 3 \text{ cm}$, both sides at points B and D .
- (iv) Join AB, BC, CD, AD .
- (v) $ABCD$ is required rhombus.



Q8 Draw a rhombus, having each side of length 3.5 cm and one of the angles as 40° .

Sol

- (i) Draw a line segment AB of length 3.5 cm.



(i) From point A and B draw angles of 40° and 140° respectively.

(ii) From points A and B cut two arcs of length 3.5 cm each to get points D and C.

(iv) Now, join AD, BC, CD to get rhombus ABCD.

Q9: one side of a rhombus is of length 4 cm and the length of an altitude is 3.2 cm. Draw the rhombus.

Solution:

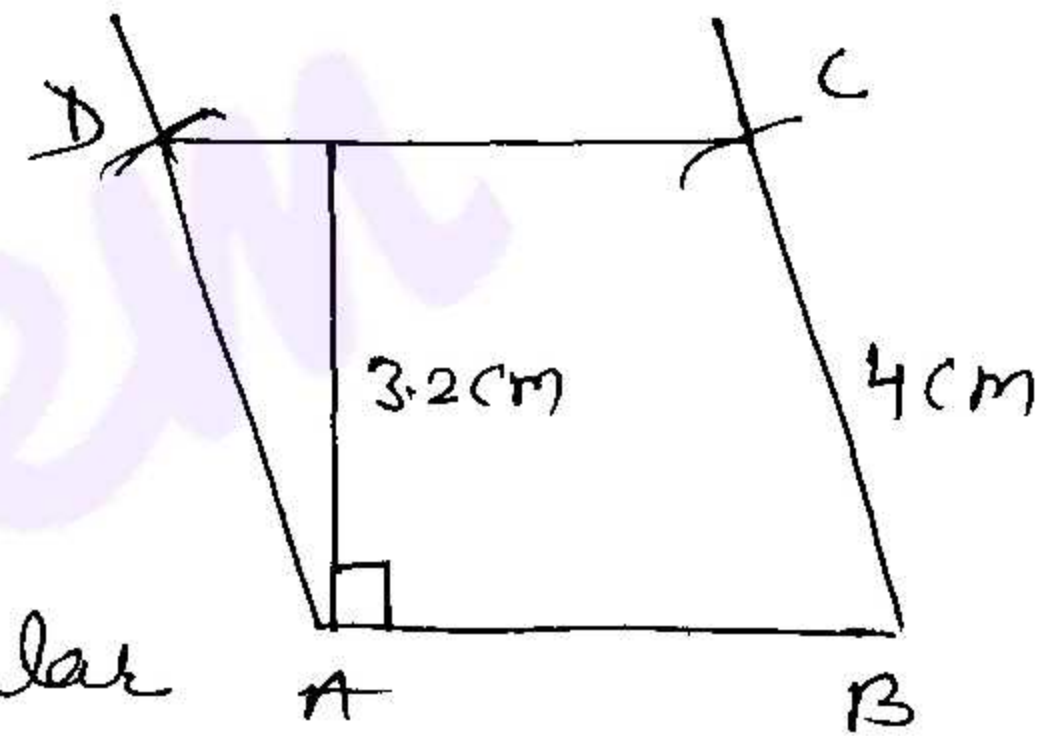
(i) Draw a line segment of 4 cm.

(ii) From point A draw perpendicular line and cut a length 3.2 cm to get point E.

(iii) From point E draw a line parallel to AB.

(iv) From points A and B cut two arcs of length 4 cm on the drawn parallel line to get points D and C.

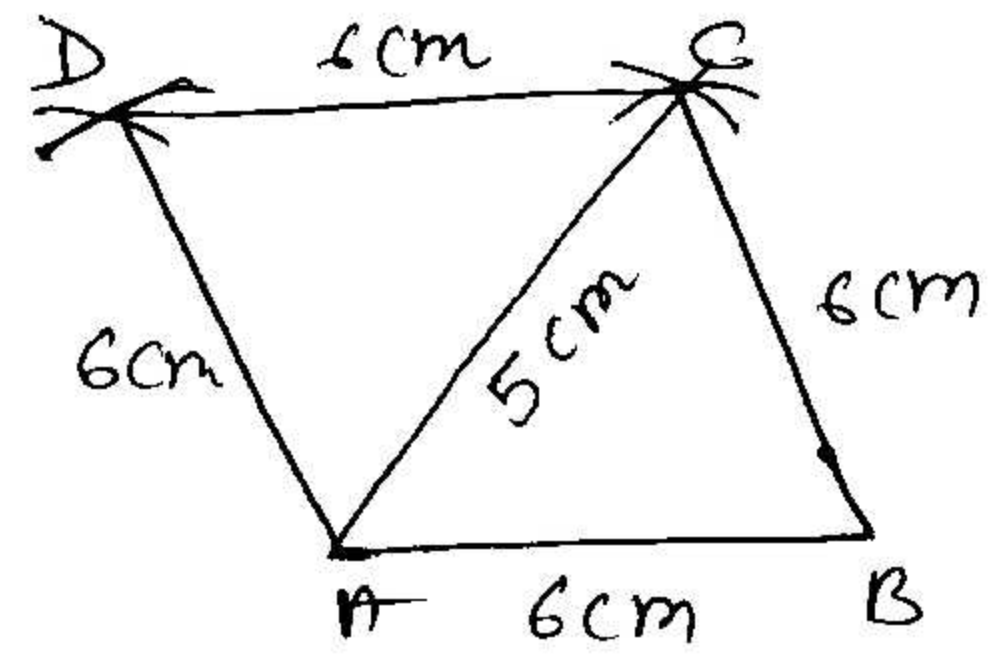
(v) Join AD, BC, and CD to get rhombus ABCD.



Q.10 Draw a rhombus ABCD, if $AB = 6\text{ cm}$ and $AC = 5\text{ cm}$

Solution:

- (i) Draw a line segment $AB = 6\text{ cm}$
- (ii) From point A cut an arc of length 5 cm and from point B cut an arc length 6 cm such that both the arcs intersect at 'C'.
- (iii) Join AC and BC
- (iv) From point A cut an arc of length 6 cm and from point C cut an arc of 6 cm , so that both the arcs intersect at point D.
- (v) Join AD and DC to get rhombus ABCD



Q.11 ABCD is a rhombus and its diagonals intersect at O.

(i) Is $\triangle BOC \cong \triangle DOC$? State the congruence condition used.

(ii) Also, state, if $\angle BCO = \angle DCO$

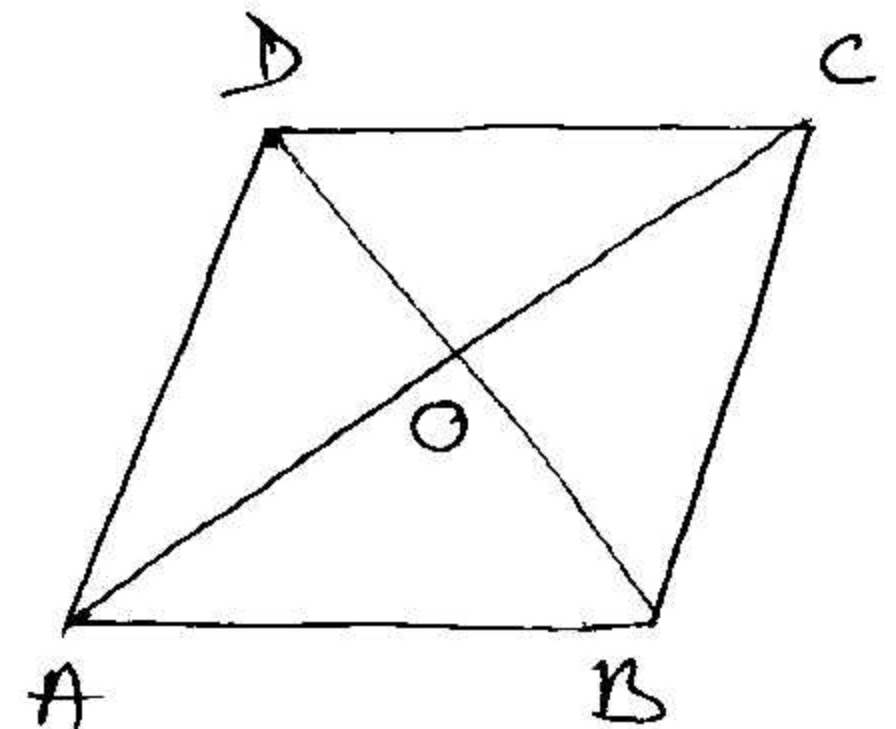
Sol: Yes, $\triangle BOC \cong \triangle DOC$

In $\triangle BOC$ and $\triangle DOC$

$BO = DO$ (Diagonals bisect each other)

$CO = CO$ (common)

$BC = CD$ (sides)

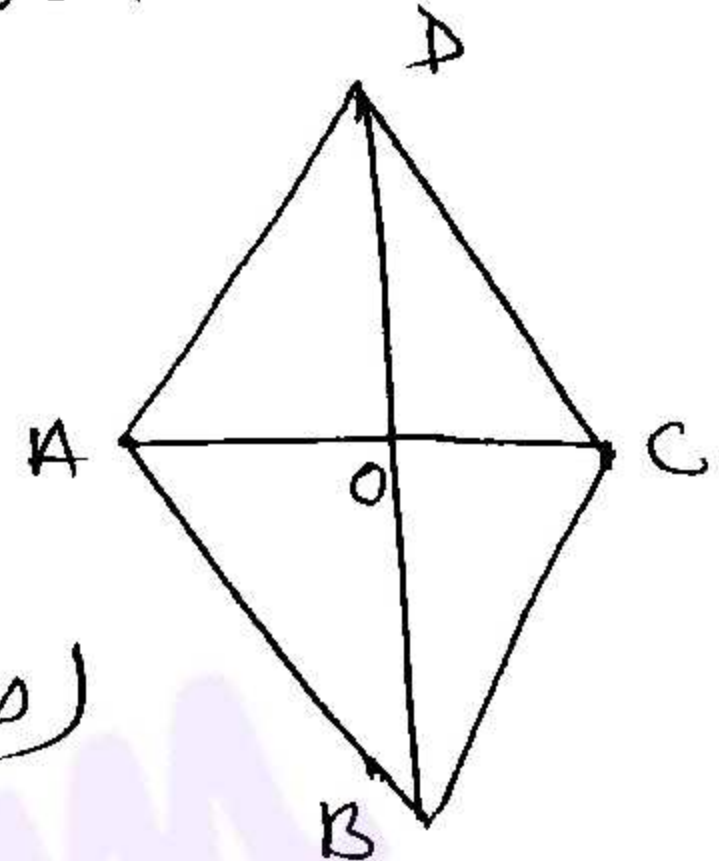


$\therefore$ By SSS
 $\triangle BOC \cong \triangle DOC$

(ii) Yes, $\angle BCO = \angle DCO$ (By CPCT)

Q12 Show that each diagonal of a rhombus bisects the angle through which it passes.

Sol: In $\triangle BOC$ and $\triangle DOC$
 $BO = DO$ (diagonals bisect)
 $CO = CO$ (Common)
 $BC = CD$ (All sides of a rhombus)

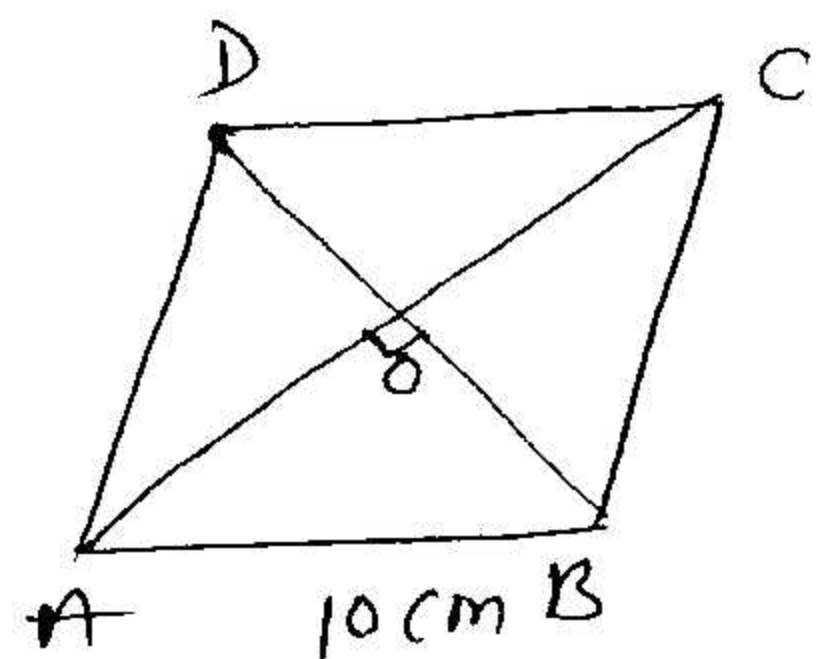


By using SSS, $\triangle BOC \cong \triangle DOC$
 $\angle BCO = \angle DCO$ (By CPCT)

$\therefore$ Each diagonal of rhombus bisects the angle through which it passes.

Q.13 ABCD is a rhombus whose diagonals intersect at O. If $AB = 10\text{ cm}$, diagonal $BD = 16\text{ cm}$. find length AC.

Sol: $\because BD = 16\text{ cm}$
 $\therefore OB = \frac{1}{2} \times 16 = 8\text{ cm}$.



In $\triangle AOB$, $AB^2 = OA^2 + OB^2$ (Pythagoras Theorem)

$$\Rightarrow 10^2 = OA^2 + 8^2$$

$$\Rightarrow OA^2 = 100 - 64 = 36$$

$$\Rightarrow OA = 6\text{ cm}$$

$$\therefore AC = 2 \times 6 = 12\text{ cm}.$$

Q.14 The diagonals of a quadrilateral are of length 6 cm and 8 cm. If the diagonals bisect each other at 90° . what is the length of each side of the quadrilateral?

Sol: length of side $= \frac{1}{2} \sqrt{d_1^2 + d_2^2}$

$$= \frac{1}{2} \sqrt{6^2 + 8^2} = \frac{1}{2} \sqrt{36 + 64}$$

$$= \frac{1}{2} \sqrt{100} = \frac{1}{2} \times 10$$

$$= 5\text{ cm}.$$