

RD SHARMA
Solutions
Class 8 Maths
Chapter 17
Ex 17.2

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) True
- (iv) False
- (v) True
- (vi) False

Diagonals of a rhombus are perpendicular, but not equal.

- (vii) True
- (viii) True

It is a parallelogram because it has two pairs of parallel sides.

- (ix) True

It is a quadrilateral because it has four sides.

- (x) True

It can be a square if each of the angle is a right angle.

- (xi) False

It is not a square because each of the angles is a right angle in a square.

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 oflength.
- (iv) The diagonals of a rhombuseach other at..... angles.
- (v) If the diagonals of a parallelogram bisect each other at right angles, then it is a

SOLUTION:

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

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

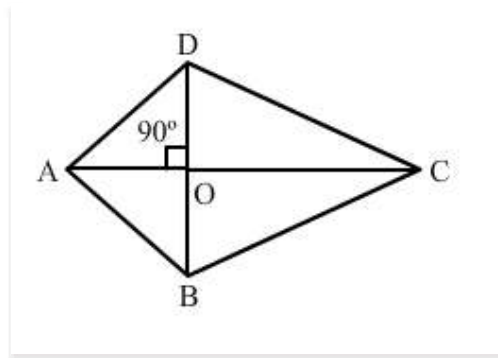
SOLUTION:

No, it is not a rhombus. This is because diagonals of a 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.

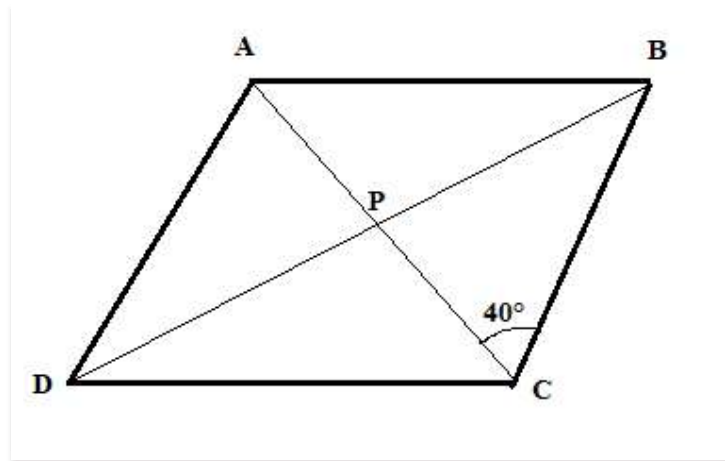
SOLUTION:

No, it is not so. Diagonals of a rhombus are perpendicular and bisect each other. Along with this, all of its sides are equal. In the figure given below, the diagonals are perpendicular to each other, but do not bisect each other.



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

SOLUTION:



In a rhombus, the diagonals are perpendicular.

Therefore, $\angle BPC = 90^\circ$

From Triangle BPC, the sum of angles is 180° .

Therefore, $\angle CBP + \angle BPC + \angle PBC = 180^\circ$

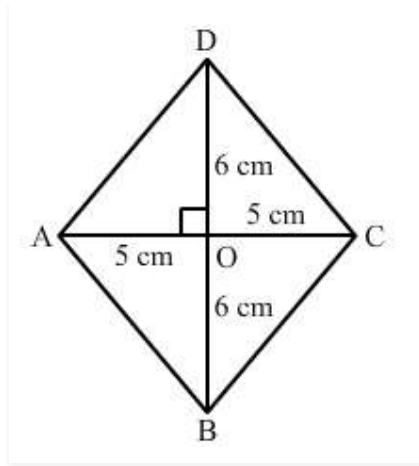
$\angle CBP = 180^\circ - \angle BPC - \angle PBC$

$\angle CBP = 180^\circ - 90^\circ - 40^\circ = 50^\circ$

$\angle ADB = \angle CBP = 50^\circ$ (alternate angle)

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

SOLUTION:



All sides of a rhombus are equal in length.

The diagonals intersect at 90° and the sides of the rhombus form right triangles.

One leg of these right triangles is equal to 8 cm and the other is equal to 6 cm.

The sides of the triangle form the hypotenuse of these right triangles.

So, we get :

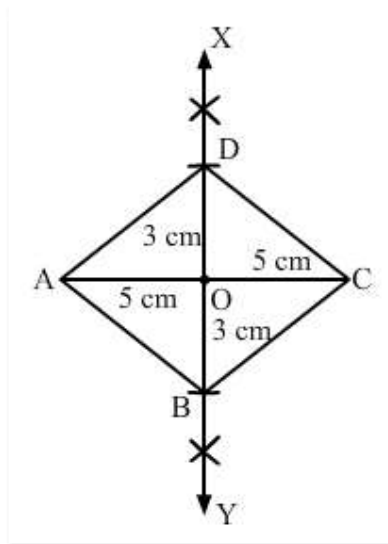
$$\begin{aligned} &(8^2 + 6^2) \text{ cm}^2 \\ &= (64 + 36) \text{ cm}^2 \\ &= 100 \text{ cm}^2 \end{aligned}$$

The hypotenuse is the square root of 100 cm^2 . This makes the hypotenuse equal to 10.

Thus, the side of the rhombus is equal to 10 cm.

Q 7. Construct a rhombus whose diagonals are of length 10 cm and 6 cm.

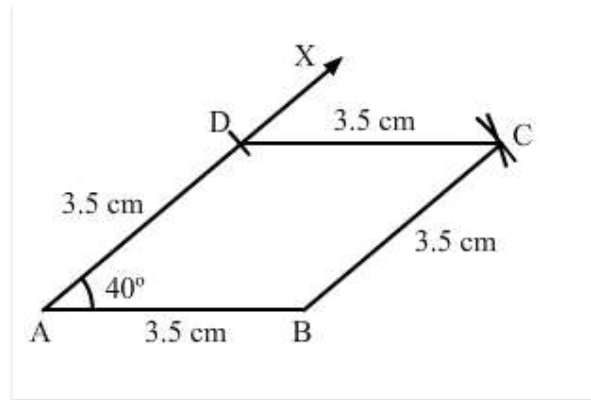
SOLUTION:



1. Draw AC equal to 10 cm.
2. Draw XY, the right bisector of AC, meeting it at O.
3. With O as centre and radius equal to half of the length of the other diagonal, i.e. 3 cm, cut $OB = OD = 3 \text{ cm}$.
4. Join AB, AD and CB, CD.

Q 8. Draw a rhombus, having each side of length 3.5 cm and one of the angles as 40° .

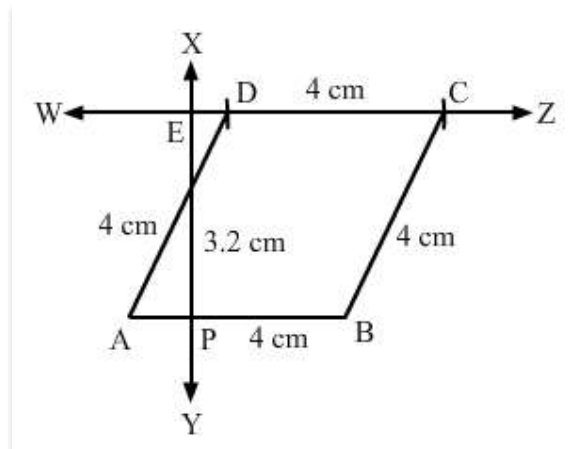
SOLUTION:



1. Draw a line segment AB of 3.5 cm.
2. Draw $\angle BAX$ equal to 40° .
3. With A as the center and the radius equal to AB, cut AD at 3.5 cm.
4. With D as the center, cut an arc of radius 3.5 cm.
5. With B as the centre, cut an arc of radius 3.5 cm. This arc cuts the arc of step 4 at C.
6. Join DC and BC.

Q 9. One side of a rhombus is of length 4 cm and the length of an altitude is 3.2 cm. Draw the rhombus.

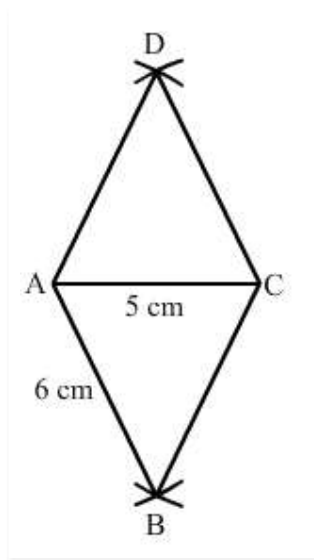
SOLUTION:



1. Draw a line segment AB of 4 cm.
2. Draw a perpendicular XY on AB, which intersects AB at P.
3. With P as the center, cut PE at 3.2 cm.
4. Draw a line WZ that passes through E. This line should be parallel to AB.
5. With A as the center, draw an arc of radius 4 cm that cuts WZ at D.
6. With D as center and radius 4 cm, cut line DZ. Label it as point C.
7. Join AD and CB.

Q10. Draw a rhombus ABCD, if AB = 6 cm and AC = 5 cm.

SOLUTION:

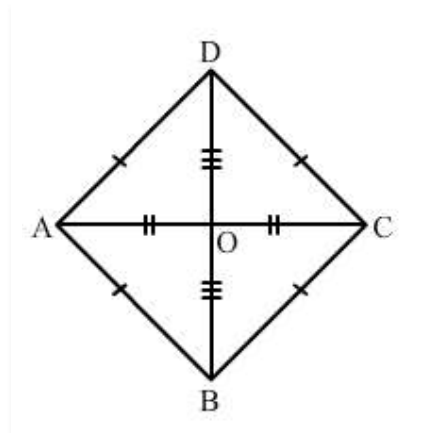


1. Draw a line segment AC of 5 cm.
2. With A as centre, draw an arc of radius 6 cm on each side of AC.
3. With C as centre, draw an arc of radius 6 cm on each side of AC. These arcs intersect the arcs of step 2 at B and D.
4. Join AB, AD, CD and CB.

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

- (i) Is $\triangle BOC = \triangle DOC$? State the congruence condition used?
(ii) Also state, if $\angle BCO = \angle DCO$.

SOLUTION:



(i) Yes

In $\triangle BCO$ and $\triangle DCO$:

OC = OC (common)

BC = DC (all sides of a rhombus are equal)

BO = OD (diagonals of a rhombus bisect each other)

By SSS congruence : $\triangle BCO \cong \triangle DCO$

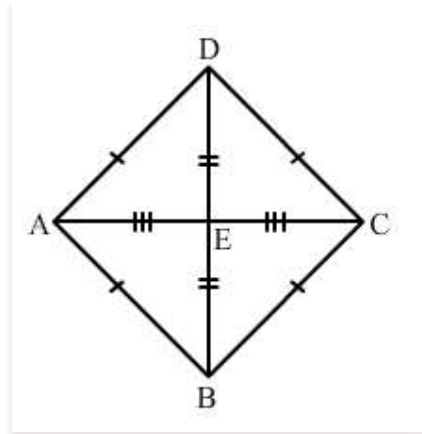
(ii) Yes

By c.p.c.t:

$$\angle BCO = \angle DCO$$

Q 12. Show that each diagonal of a rhombus bisects the angle through which it passes.

SOLUTION:



In $\triangle AED$ and $\triangle DEC$:

$AE = EC$ (diagonals bisect each other)

$AD = DC$ (sides are equal)

$DE = DE$ (common)

By SSS congruence : $\triangle AED \cong \triangle CED$

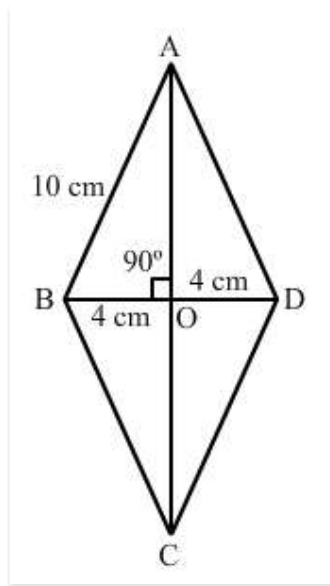
$\angle ADE = \angle CDE$ (c. p. c. t)

Similarly, we can prove $\triangle AEB$ and $\triangle BEC$, $\triangle BEC$ and $\triangle DEC$, $\triangle AED$ and $\triangle AEB$ are congruent to each other.

Hence, diagonal of a rhombus bisects the angle through which it passes.

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

SOLUTION:



We know that the diagonals of a rhombus bisect each other at right angles.

$$\text{Therefore, } BO = \frac{1}{2} BD = \left(\frac{1}{2} \times 16\right) \text{ cm} = 8 \text{ cm}$$

$$AB = 10 \text{ cm and } \angle AOB = 90^\circ$$

From right $\triangle OAB$:

$$AB^2 = AO^2 + BO^2$$

$$AO^2 = (AB^2 - BO^2)$$

$$AO^2 = (10)^2 - (8)^2 \text{ cm}^2$$

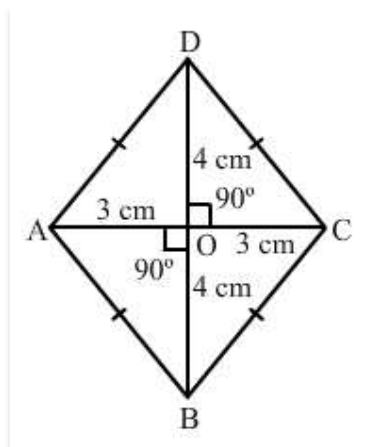
$$AO^2 = (100 - 64) \text{ cm}^2 = 36 \text{ cm}^2$$

$$AO = 6 \text{ cm}$$

$$\text{Therefore, } AC = 2 \times AO = (2 \times 6) \text{ cm} = 12 \text{ cm.}$$

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

SOLUTION:



Let the given quadrilateral be ABCD in which diagonals AC is equal to 6 cm and BD is equal to 8 cm.

Also, it is given that the diagonals bisect each other at right angle, at point O.

$$\text{Therefore, } AO = OC = \frac{1}{2} AC = 3 \text{ cm}$$