

Exercise 17.3

(30)

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

- (i) It has two pairs of equal sides.
- (ii) It has all its sides of equal length.
- (iii) Its diagonals are equal.
- (iv) Its diagonals bisect each other.
- (v) Its diagonals are perpendicular.
- (vi) Its diagonals are perpendicular and bisect each other.
- (vii) Its diagonals are equal and bisect each other.
- (viii) Its diagonals are equal and perpendicular, and bisect each other.
- (ix) All rectangles are squares.
- (x) All rhombuses are parallelograms.
- (xi) All squares are rhombuses and also rectangles.
- (xii) All squares are not parallelograms.

Solution:

(i) True

(ii) False

(iii) True

(iv) True

(v) False

(vi) False

(vii) True

(viii) False

(ix) False

(x) True

(xi) True

(xii) False

Q.2 Which of the following statements are true for a square.

(i) It is a rectangle.

(ii) It has all its sides of equal length.

- (iii) Its diagonals bisect each other at right angle. (31)
 (iv) Its diagonals are equal to its sides.

Sol: (i) True (ii) True (iii) True (iv) False.

Q.3 Fill in the blanks in each of the following, so as to make the statement true.

Sol: (i) A rectangle is a parallelogram in which

(ii) A square is a rhombus in which

(iii) A square is a rectangle in which

Sol: (i) one angle is a right angle.

(ii) one angle is a right angle.

(iii) adjacent sides are equal.

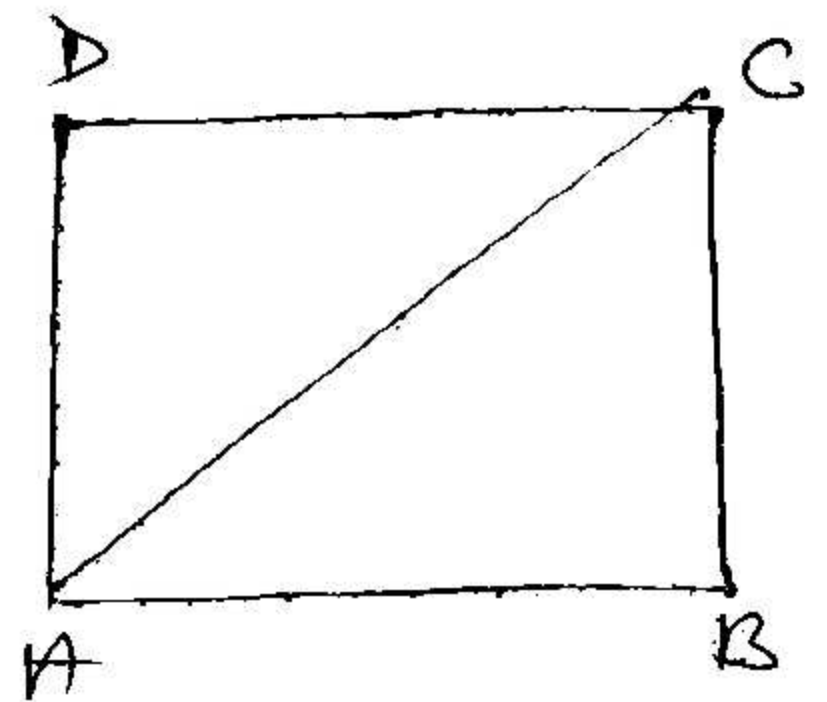
Q.4 A window frame has one diagonal longer than the other. Is the window frame a rectangle. Why or why not?

Sol: No, as diagonals of rectangle are equal.

Q.5 In a rectangle ABCD, Prove that $\triangle ACB \cong \triangle CAD$

Sol: In $\triangle ACB$ and $\triangle CAD$

$AB = DC$ { opp. sides are }
 $AD = BC$ { equal }
 $AC = AC$ (common)



∴ By SSS $\triangle ACB \cong \triangle CAD$.

Q.6 The sides of a rectangle are in the ratio 2:3. And its perimeter is 20 cm. Draw the rectangle.

Sol: let sides of rectangle are $2x$ and $3x$

$$\text{Perimeter} = 2(l+b)$$

$$\Rightarrow 20 = 2(2x+3x)$$

$$\Rightarrow 20 = 10x$$

$$\Rightarrow x = \frac{20}{10}$$

$$\Rightarrow x = 2$$

$$\text{Then sides} = 2x = 2 \times 2 = 4 \text{ cm}$$

$$3x = 3 \times 2 = 6 \text{ cm.}$$

Q.7 The sides of rectangle are in the ratio 4:5. Find its sides if the perimeter is 90 cm.

Sol: let length = $4x$
breadth = $5x$

$$\therefore P = 90$$

$$\Rightarrow 2(l+b) = 90$$

$$\Rightarrow 2(4x+5x) = 90$$

$$\Rightarrow 2 \times 9x = 90$$

$$\Rightarrow 18x = 90$$

$$\Rightarrow x = \frac{90}{18} = 5$$

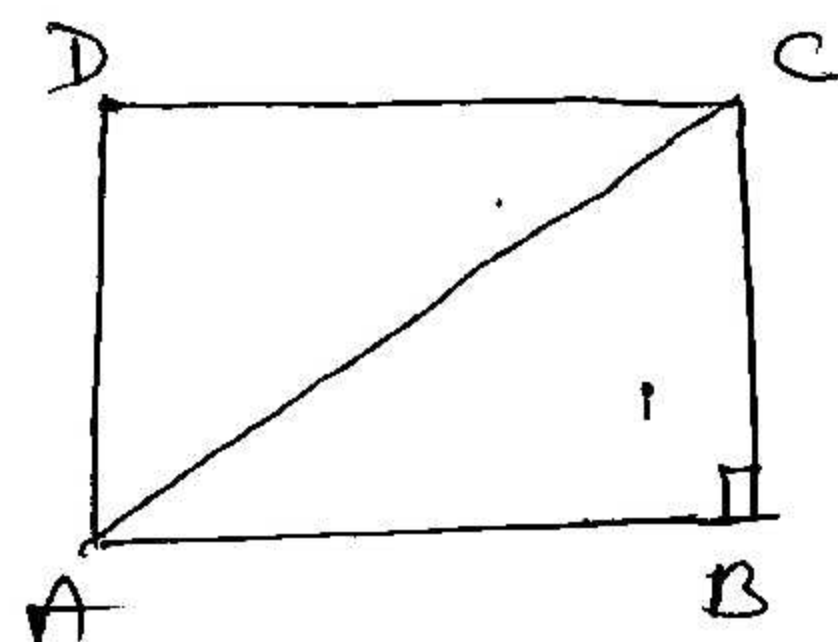
$$\therefore \text{Sides} = 4x = 4 \times 5 = 20 \text{ cm, } 5x = 5 \times 5 = 25 \text{ cm.}$$

Q.8 Find the length of the diagonal of a rectangle ⁽³³⁾ whose sides are 12cm and 5cm.

Sol: here $AB = 12\text{cm}$, $BC = 5\text{cm}$

$$\begin{aligned} \therefore AC^2 &= AB^2 + BC^2 \\ &= (12)^2 + (5)^2 \\ &= 144 + 25 \\ &= 169 \end{aligned}$$

$$\therefore AC = \sqrt{169} = 13\text{cm}.$$

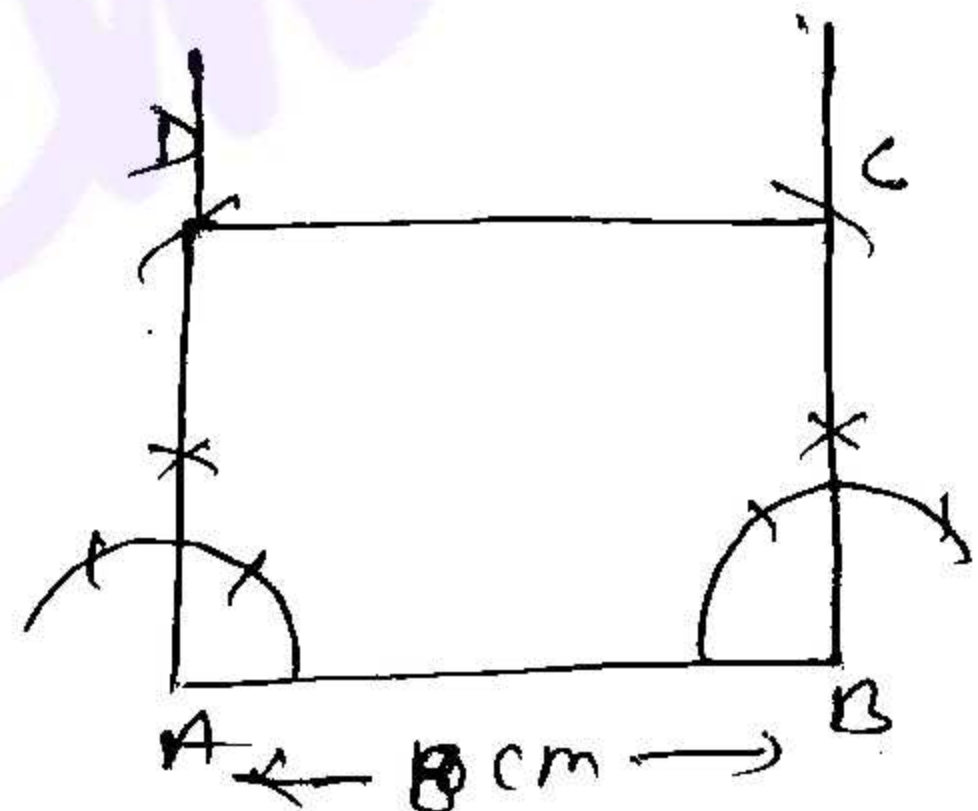


Q.9 Draw a rectangle whose one side measures 8 cm and length of each of whose diagonals is 10 cm.

Sol: (i) Draw a line segment

$AB = 8\text{cm}$.

(ii) Draw perpendiculars at points A and B.



(iii) from point A and C cut arcs of length 10 cm, which meet perpendiculars at points C and A.

(iv) Join BC, CD, AD

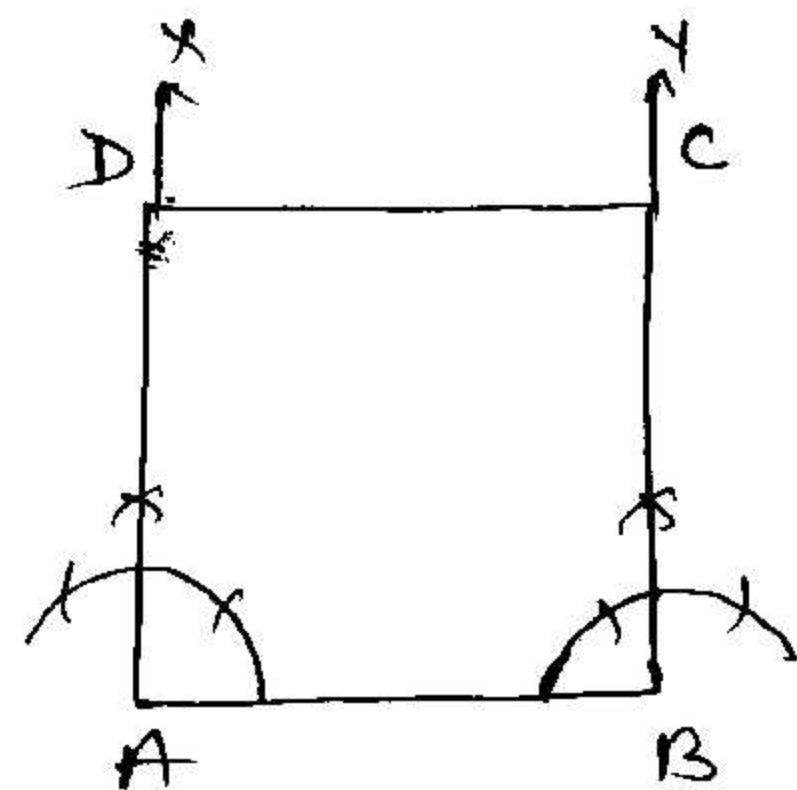
(v) ABCD is the required rectangle.

Q.10 Draw a square whose each side measures 4.8 cm.

Sol: (i) Draw a line segment $AB = 4.8$ cm

(ii) Make an angle of 90° at points A and B.

(iii) From points A and B cut arcs of length 4.8 cm, which meet AX and BY at points D and C respectively.



(iv) Thus ABCD is a required square.

Q.11 Identify all the quadrilaterals that have.

(i) Four sides of equal length.

(ii) Four right angles.

Sol (i) Square, rhombus

(ii) Square, Rectangle.

Q.12 Explain how a square is -

(i) A quadrilateral

(ii) a parallelogram.

(iii) a rhombus

(iv) a rectangle.

Sol: (i) Square is a quadrilateral as it is a four sided bounded figure.

(ii) Square is a parallelogram as opposite sides are equal and parallel.

- (iii) A rhombus because all sides are equal
- (iv) a rectangle because opposite sides are equal.

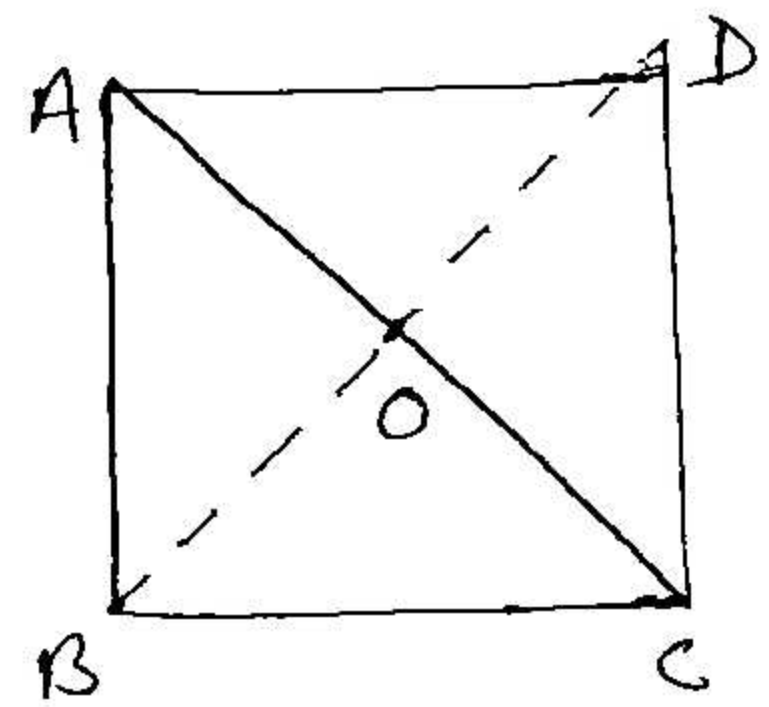
Q.13 Name the Quadrilaterals whose diagonals:

(i) bisect each other (ii) are perpendicular bisector of each other (iii) are equal.

Sol: (i) Parallelograms, Rectangle, Square, Rhombus.
 (ii) Square, Rhombus
 (iii) Square, Rectangle.

Q.14 $\triangle ABC$ is right angled triangle and O is the mid point of the sides opposite to the right angle. Explain why O is equidistant from A, B and C .

Sol: Const. Join OB , and produce it to points D . Then join AD and CD



Then $ABCD$ is a rectangle.
 also, we know that diagonals of ~~rhombus~~ rectangle are equal and bisect each other.

$$\therefore OA = OB = OC = OD$$

hence O is equidistant from A, B and C .

Q.15

A mason has made a concrete slab. He needs it to be rectangular. In what different ways can he make sure that it is rectangular.

Sol: (i) By measuring each angle that it should be 90° .

(ii) Also, By measuring opposite sides.

(iii) By measuring diagonals.

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