

Practice Set 15.2

1. Lengths of the diagonals of a rhombus are 15cm and 24 cm, find its area.

Solⁿ:- For rhombus,

$$d_1 = 15 \text{ cm}$$

$$d_2 = 24 \text{ cm}$$

$$A = ?$$

$$\begin{aligned} \therefore A &= \frac{1}{2} \times d_1 \times d_2 \\ &= \frac{1}{\cancel{2}} \times 15 \times \cancel{24}^{12} \\ &= 15 \times 12 \end{aligned}$$

$$\therefore \boxed{A = 180 \text{ cm}^2}$$

2. Lengths of the diagonals of a rhombus are 16.5 cm and 14.2 cm, find its area.

Solⁿ:- For rhombus,

$$d_1 = 16.5 \text{ cm}$$

$$d_2 = 14.2 \text{ cm}$$

$$A = ?$$

$$\therefore A = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 16.5 \times 14.2$$

$$= 16.5 \times 7.1$$

$$A = 117.15 \text{ cm}^2$$

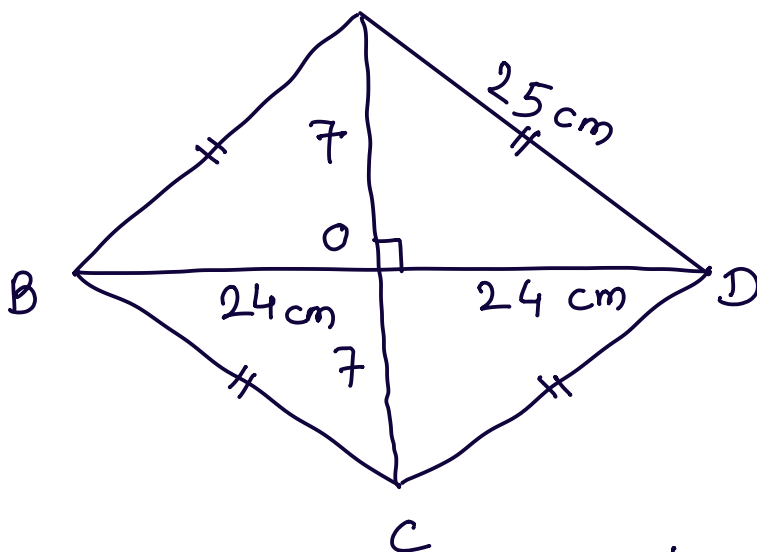
3. If perimeter of a rhombus is 100 cm and length of one diagonal is 48 cm, what is the area of the quadrilateral?

Soln:- For rhombus,

$$\text{Perimeter} = 100 \text{ cm}$$

$$d_1 = 48 \text{ cm} = BD$$

$$A = ?$$



Perimeter of rhombus

$$= 4 \times \text{side}$$

$$100 = 4 \times \text{side}$$

$$\therefore \text{side} = \frac{100}{4}$$

$$\therefore \text{side} = 25 \text{ cm}$$

We know that, the diagonals of the rhombus are perpendicular bisectors of each other.

$$\begin{aligned}BO &= OD = \frac{1}{2} \times BD \\ &= \frac{1}{2} \times 48\end{aligned}$$

$$BO = OD = 24 \text{ cm}$$

\therefore In $\triangle AOD$,

$$\angle AOD = 90^\circ$$

\therefore By Pythagoras theorem,

$$\therefore AD^2 = AO^2 + OD^2$$

$$(25)^2 = AO^2 + (24)^2$$

$$625 = AO^2 + 576$$

$$\therefore AO^2 = 625 - 576$$

$$\therefore AO^2 = 49$$

$$\therefore \boxed{AO = 7 \text{ cm}}$$

$$\therefore AC = 2 \times AO$$

$$= 2 \times 7$$

$$\therefore AC = 14 \text{ cm}$$

$$\therefore \text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times BD \times AC$$

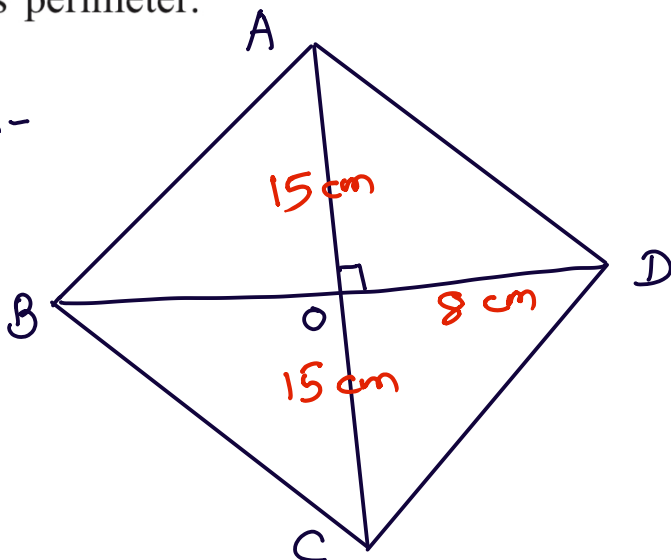
$$= \frac{1}{2} \times 48 \times 14$$

$$= 48 \times 7$$

$$\therefore \text{Area of rhombus} = 336 \text{ cm}^2$$

4*. If length of a diagonal of a rhombus is 30 cm and its area is 240 sq cm, find its perimeter.

Soln:-



For rhombus,

$$d_1 = AC = 30 \text{ cm}$$

$$A = 240 \text{ cm}^2$$

Perimeter = ?

Area of rhombus,

$$= \frac{1}{2} \times d_1 \times d_2$$

$$240 = \frac{1}{2} \times AC \times BD$$

$$240 = \frac{1}{2} \times \cancel{30}^{15} \times BD$$

$$\therefore BD = \frac{240}{15}$$

$$\therefore \boxed{BD = 16 \text{ cm}}$$

We know that, the diagonals of the rhombus are perpendicular bisectors of each other.

$$\therefore AO = \frac{1}{2} \times AC$$

$$\therefore AO = \frac{1}{2} \times 30$$

$$\therefore \boxed{AO = 15 \text{ cm}}$$

$$\& \quad OD = \frac{1}{2} \times BD$$

$$= \frac{1}{2} \times 16$$

$$\boxed{OD = 8 \text{ cm}}$$

In $\triangle AOD$,

$$\angle AOD = 90^\circ$$

\therefore By Pythagoras theorem,

$$AD^2 = AO^2 + OD^2$$

$$= (15)^2 + (8)^2$$

$$= 225 + 64$$

$$AD^2 = 289$$

$$\therefore \boxed{AD = 17 \text{ cm}}$$

Now,

Perimeter of rhombus ABCD

$$= 4 \times AD$$

$$= 4 \times 17$$

$$= \underline{\underline{68 \text{ cm}}}$$