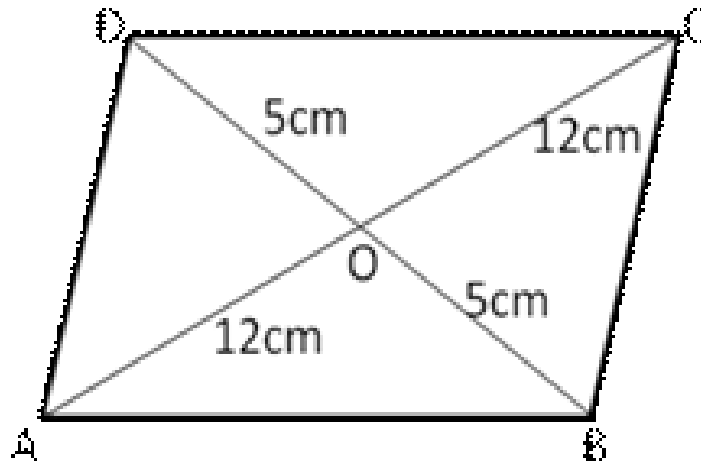Question 15:

Let ABCD be the given rhombus whose diagonals intersect at O.

Then AC = 24 cm and BD = 10 cm

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

$OA = \dfrac{1}{2}AC = 12\,cm$

$OB = \dfrac{1}{2}BD = 5\,cm$

and $\angle AOB = 90°$

From right $\triangle AOB$, we have

$AB^2 = OA^2 + OB^2$

$\Rightarrow AB^2 = \left[(12)^2 + (5)^2\right]cm^2 = (144 + 25)\,cm^2 = 169\,cm^2$
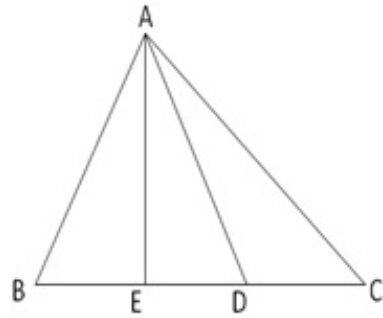
$\Rightarrow AB = \sqrt{169}\ cm = 13\,cm$

Hence, each side of a rhombus 13 cm

Question 16:

Given: ΔABC in which D is the midpoint of BC. AE ⊥ BC and AC > AB.

Then, BD = CD and $\angle AED = 90^0$

Then, $\angle ADE < 90^0$ and $\angle ADC > 90^0$

In $\triangle AED$,

$\angle AED = 90°$

$\therefore AD^2 = AE^2 + DE^2$

$\Rightarrow AE^2 = \left(AD^2 - DE^2\right) - -(1)$

In $\triangle AEB$, $\angle AEB = 90°$

$\therefore AB^2 = AE^2 + BE^2 \quad --(2)$

Putting value of AE^2 from (1) in (2), we get

$\therefore AB^2 = \left(AD^2 - DE^2\right) + BE^2$

$\qquad = \left(AD^2 - DE^2\right) + \left(BD^2 - DE^2\right) \left[\text{But } BD = \frac{1}{2}BC \right]$

$\qquad = AD^2 - DE^2 + \left(\frac{1}{2}BC - DE\right)^2$

$\qquad = AD^2 - DE^2 + \frac{1}{4}BC^2 + DE^2 - BC.DE$

$AB^2 = AD^2 - BC.\ DE + \frac{1}{4}BC^2$

********** END *********