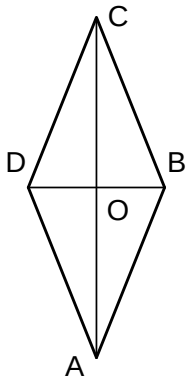
Answer on Question#39373 – Math - Geometry

A rhombus has one of its sides as $10\ cm$ and one angle as $40\ degree$. Find the area of the rhombus.

Solution:



If a quadrilateral is a rhombus, then:

- all four sides are equal

- the diagonals bisect each other at right angles

- the diagonals bisect each vertex angles

So $\Delta AOB, \Delta COB, \Delta AOD$ and ΔCOD are right triangles and $\Delta AOB = \Delta COB = \Delta AOD = \Delta COD$

The area of the rhombus is:

$$A_{ABCD} = 4A_{\Delta AOB}$$

$$A_{\Delta AOB} = \frac{1}{2} AO \cdot BO$$

$$AO = AB \cdot \cos \angle OAB$$

$$BO = AB \cdot \sin \angle OAB$$

$$\angle OAB = \angle OAD = \frac{1}{2} \angle BAD = \frac{1}{2} \cdot 40° = 20°$$

$$AO = 10 \cdot \cos 20° = 9.40$$

$$BO = 10 \cdot \sin 20° = 3.42$$

$$A_{ABCD} = 4 \cdot \frac{1}{2} \cdot 9.40 \cdot 3.42 = 64.30\ cm^2$$

Answer: The area of the rhombus is $64.30\ cm^2$