

To prove $AB = CD$
 Const - draw $OM \perp AD$

Proof - $OM \perp AD$

$\Rightarrow AM = MD$ [Per. from centre of \odot to chord bisects it] ... (i)

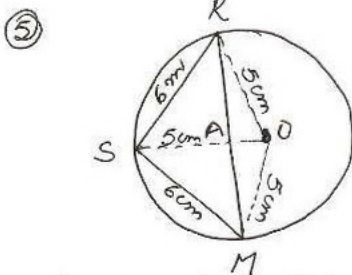
$OM \perp BC$

$\Rightarrow BM = CM$ (do) ... (ii)

(i) - (ii)

$AM - BM = MD - CM$

$\Rightarrow AB = CD$



To find - RM

Sol - $\square SMOR$ is a kite [OR = OM, SR = SM]

$\Rightarrow SO \perp RM$ [diagonals of a kite are \perp to each other]

$$\begin{aligned} \Delta RSO \\ s &= \frac{a+b+c}{2} \\ &= 8 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{area} &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{8 \times 3 \times 3 \times 2} \\ &= 12 \text{ cm}^2 \end{aligned}$$

$$\text{ar}(\Delta RSO) = 12 \text{ cm}^2$$

$$\frac{1}{2} \times SO \times RA = 12$$

$$\frac{1}{2} \times 5 \times RA = 12$$

$$\Rightarrow RA = \frac{24}{5} \text{ cm}$$

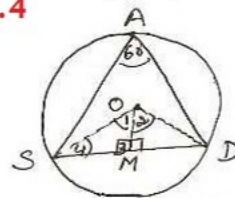
$$\text{Sum. } MA = \frac{24}{5} \text{ cm}$$

$$RM = \frac{24}{5} + \frac{24}{5}$$

$$= \frac{48}{5}$$

$$= 9.6 \text{ cm}$$

(6)



To find - AS, OS, SD or AD
 Const - join OS, OD , draw $OM \perp SD$

Sol - $\angle A = 60^\circ$ [each \angle of equilateral Δ]

$$\begin{aligned} \angle SOD &= 2 \times 60^\circ \text{ [angle sub. at} \\ &= 120^\circ \text{ centre of } \odot \\ &\text{ is twice angle} \\ &\text{ sub. on} \\ &\text{ rem. part of } \odot] \end{aligned}$$

$$\begin{aligned} \angle 1 = \angle 2 &= \frac{1}{2} \angle SOD \\ &= \frac{1}{2} \times 120^\circ \\ &= 60^\circ \end{aligned} \quad \left[\begin{array}{l} \text{In an isos.} \\ \Delta \text{ altitude to} \\ \text{base is also} \\ \text{median and} \\ \text{bisector of vertex} \\ \text{angle} \end{array} \right]$$

In ΔSOM

$$\angle 1 + \angle 3 + \angle 4 = 180^\circ \text{ [angle sum prop of } \Delta]$$

$$(60^\circ + 90^\circ + \angle 4) = 180^\circ$$

$$\Rightarrow \angle 4 = 180^\circ - 150^\circ = 30^\circ$$

\therefore angles of ΔSOM are $30^\circ, 60^\circ, 90^\circ$

$$OS = 2(OM)$$

$$\frac{20}{2} = OM$$

$$\Rightarrow OM = 10 \text{ cm}$$

In rt ΔSMO

$$SM^2 = OS^2 - OM^2 \text{ (Pyth. th.)}$$

$$= 20^2 - 10^2$$

$$= 400 - 100$$

$$= 300$$

$$SM = \sqrt{300}$$

$$= 10\sqrt{3} \text{ cm}$$

$$\therefore DM = SM = 10\sqrt{3}$$

$$SD = 10\sqrt{3} + 10\sqrt{3}$$

$$= 20\sqrt{3} \text{ cm}$$