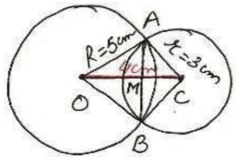
(1)



To find - AB

Const - join OA, OB, CA, CB

Sol - □OBCA is a kite [OA = OB = R, CA = CB = r]

$\Rightarrow AB \perp OC$ [diagonals of a kite are $\perp$ to each other]

$\underline{\triangle OAC}$

$$s = \frac{a+b+c}{2} = \frac{5+3+4}{2} = 6\text{ cm}$$

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{6(6-5)(6-3)(6-4)} = \sqrt{6\times1\times3\times2} = 6\text{ cm}^2$$

$$ar(\triangle OAC) = 6\text{ cm}^2$$

$$\frac{1}{2}\times OC\times AM = 6$$

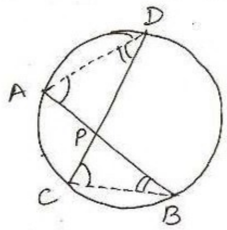
$$\cancel{\frac{1}{2}}\times \cancel{4}^{\,1}\times AM = \cancel{6}^{\,3}$$

$\Rightarrow AM = 3$ cm

Sim. BM = 3 cm

$\therefore AB = AM + BM = 3+3 = 6$ cm.

(2)



To prove PA = PC
PB = PD

Const

Proof AB = CD (given)

$\Rightarrow \overset{\frown}{AB} = \overset{\frown}{DC}$

$\Rightarrow \overset{\frown}{AB} - \overset{\frown}{AC} = \overset{\frown}{DC} - \overset{\frown}{AC}$

$\Rightarrow \overset{\frown}{DA} = \overset{\frown}{CB}$

$\Rightarrow DA = CB$

In $\triangle APD$ and $\triangle CPB$

$\angle A = \angle C$ [angles in same segment]

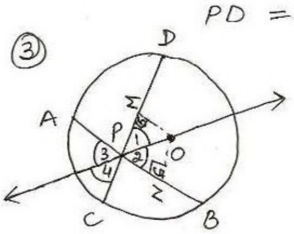
$AD = BC$ (proved)

$\angle D = \angle B$ [angles in same segment]

$\therefore \triangle APD \cong \triangle CPB$ by ASA prop.

$PA = PC$
$PD = PB$ (cpct)

(3)



To prove $\angle 1 = \angle 2$
$\angle 3 = \angle 4$

Const - draw $OM \perp CD$
$ON \perp AB$

Proof In $\triangle OMP$ and $\triangle ONP$

$\angle 5 = \angle 6 = 90°$

$OP = OP$ (common)

$OM = ON$ [equal chords are equidistant from centre of ⊙]

$\therefore \triangle OMP \cong \triangle ONP$

$\angle 1 = \angle 2$ ---(i) (cpct)

$\angle 1 = \angle 4$ ---(ii) [ver. opp. ∠s]
$\angle 2 = \angle 3$ ---(iii)

From (i), (ii), (iii)

$\angle 3 = \angle 4$