$3(x+14)x = x^2+196+28x$

$\Rightarrow 3x^2+42x = x^2+196+28x$

$2x^2+14x-196=0$

$\Rightarrow x^2+7x-98=0$

$\Rightarrow x^2+14x-7x-98=0$

$\Rightarrow x(x+14)-7(x+14)=0$

$\Rightarrow (x+14)(x-7)=0$

$\Rightarrow x+14=0,\ x-7=0$

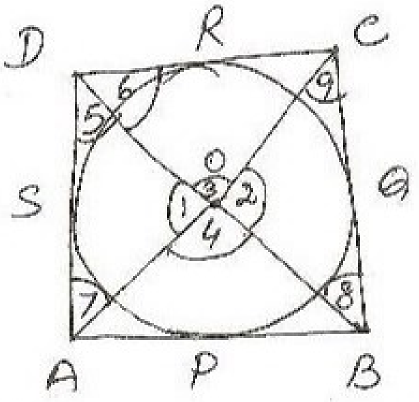
$\Rightarrow x=-14,\ x=7$

rejected

$\therefore AB = 6+7 = 13$ cm

$AC = 8+7 = 15$ cm

(13)



To Prove $\angle 1+\angle 2 = 180°$

$\angle 3+\angle 4 = 180°$

Proof $\angle 5 = \angle 6$ [tangents are equally inclined to the line joining centre of ⊙ to external point)

$\therefore \angle 5 = \frac{1}{2}\angle CDA \quad \ldots (i)$

Sim. $\angle 7 = \frac{1}{2}\angle DAB \quad \ldots (ii)$

$\angle 8 = \frac{1}{2}\angle ABC \quad \ldots (iii)$

$\angle 9 = \frac{1}{2}\angle BCD \quad \ldots (iv)$

(i) + (ii) + (iii) + (iv)

$\angle 5+\angle 6+\angle 7+\angle 8$

$= \frac{1}{2}(\angle DAB+\angle ABC+\angle BCD + \angle CDA)$

$= \frac{1}{2}\times 360°$

$= 180°$

adding $\angle 1, \angle 2$ on both sides

$\angle 1+\angle 5+\angle 7+\angle 2+\angle 8+\angle 9 = 180°+\angle 1+\angle 2$

$\cancel{180°}+180° = \cancel{180°}+\angle 1+\angle 2$ (angle sum prop of $\triangle$)

$\Rightarrow \angle 1+\angle 2 = 180°$

Sim $\angle 3+\angle 4 = 180°$