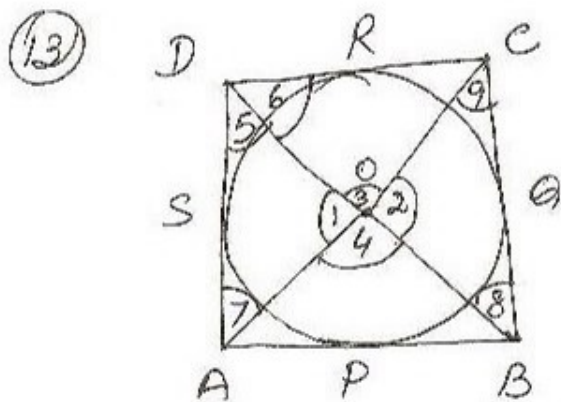


$$\begin{aligned}
 3(x+14)x &= x^2 + 196 + 28x \\
 \Rightarrow 3x^2 + 42x &= x^2 + 196 + 28x \\
 2x^2 + 14x - 196 &= 0 \\
 \Rightarrow x^2 + 7x - 98 &= 0 \\
 \Rightarrow x^2 + 14x - 7x - 98 &= 0 \\
 \Rightarrow x(x+14) - 7(x+14) &= 0 \\
 \Rightarrow (x+14)(x-7) &= 0 \\
 \Rightarrow x+14=0, x-7=0 \\
 \Rightarrow x = -14, x = 7 \\
 &\text{rejected}
 \end{aligned}$$

$$\begin{aligned}
 \therefore AB &= 6+7 = 13 \text{ cm} \\
 AC &= 8+7 = 15 \text{ cm}
 \end{aligned}$$



To Prove $L1 + L2 = 180^\circ$
 $L3 + L4 = 180^\circ$

Proof $L5 = L6$ [tangents are equally inclined to the line joining centre of \odot to external point]

$$\begin{aligned}
 \therefore L5 &= \frac{1}{2} \angle CDA \dots \textcircled{i} \\
 \text{Sim. } L7 &= \frac{1}{2} \angle DAB \dots \textcircled{ii} \\
 L8 &= \frac{1}{2} \angle ABC \dots \textcircled{iii} \\
 L9 &= \frac{1}{2} \angle BCD \dots \textcircled{iv}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{i} + \textcircled{ii} + \textcircled{iii} + \textcircled{iv} \\
 L5 + L6 + L7 + L8 \\
 &= \frac{1}{2} (\angle DAB + \angle ABC + \angle BCD + \angle CDA) \\
 &= \frac{1}{2} \times 360 \\
 &= 180^\circ
 \end{aligned}$$

adding $L1, L2$ on both sides

$$\begin{aligned}
 L1 + L5 + L7 + L2 + L8 + L9 &= 180^\circ + L1 + L2 \\
 180 + 180 &= 180 + L1 + L2 \\
 &\text{(angle sum prop of } \Delta)
 \end{aligned}$$

$$\begin{aligned}
 \Rightarrow L1 + L2 &= 180^\circ \\
 \text{Sim } L3 + L4 &= 180^\circ
 \end{aligned}$$