**SECOND PRIZE WINNER MR.HRUDHANANDHA BHOI’S SOLUTION**

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**Given : O is a point outside the circle.** $\overbar{AB}, \overbar{CD}$**,** $\overbar{PQ},\& \overbar{RS}$ **are 4 chords of the circle. K,L,M,M are midpoints of** $\overbar{AB}, \overbar{CD}$**,** $\overbar{PQ}, \& \overbar{RS}$ **respectively and** $m∠LOK=m∠MOK.$

**Claim :** $\overbar{LM} ∥\overbar{KN}$

**Construction :**

$\overbar{GM},\overbar{GN},\overbar{GL},\overbar{GK}, \& \overbar{MK}$ **are constructed where G is the centre of the circle.**

**Proof:**

 **K,L,M,N are midpoints of** $\overbar{AB}, \overbar{CD}$**,** $\overbar{PQ},\& \overbar{RS}$

$⟹$$\overbar{GK}⊥\overbar{AB}$**,** $\overbar{GL}⊥\overbar{CD}$**,** $\overbar{GM}⊥\overbar{PQ}$**,** $\overbar{GN}⊥\overbar{RS}$

$⟹$$m∠GKO=m∠GLO=m∠GMO=m∠GNO$ **= 90**$°$

**As**$ m∠GMO+ m∠GKO= m∠GNO+ m∠GKO$ **=** $m∠GNO+ m∠GLO= m∠GMO+ m∠GLO$ **= 90**$°$**+ 90**$°$ **= 180**$°$

**G, M, O, K are Cyclic & G, N, O, K are cyclic and G, N, O, L are cyclic & G, M, O, L are cyclic. We can draw only one circle through three non collinear points. So, all these points are on the same circle.**

$⟹$ **K, L, G, M, N, O are on the same circle**

$⟹$$m∠LGK=m∠LMK=m∠LOK and m∠MKN= m∠MON$

$⟹ m∠LMK= m∠MKN$ **(as** $m∠LOK= m∠MON given)$

$⟹$$\overbar{LM} ∥\overbar{KN} $ **-------------------- Proved.**