

## Problem 7

### The Lester circle is orthogonal to the Orthocentroidal Circle of the Triangle of the Nine-Point Centers of the Anticevian Corner Triangles of the Centroid

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At the present time, there are seven notable circles known to be orthogonal to the Lester circle. See [1]. The below problem introduces a new notable circle which is orthogonal to the Lester circle.

Prove the following problem, produced by the computer program “Discoverer”:

**Problem 7.** Given  $\triangle ABC$ . The Lester circle of  $\triangle ABC$  is the circle passing through the circumcenter, nine-point center and the outer Fermat point. Let  $J_aJ_bJ_c$  is the antimedial triangle,  $D$ ,  $E$  and  $F$  are the nine-point centers of triangles  $BJ_aC$ ,  $ACJ_b$  and  $AJ_cB$ , respectively,  $G$  is the centroid of  $\triangle DEF$  and  $H$  is the orthocenter of  $\triangle DEF$ . Prove that the circle having as diameter the segment  $GH$  is orthogonal to the Lester circle.

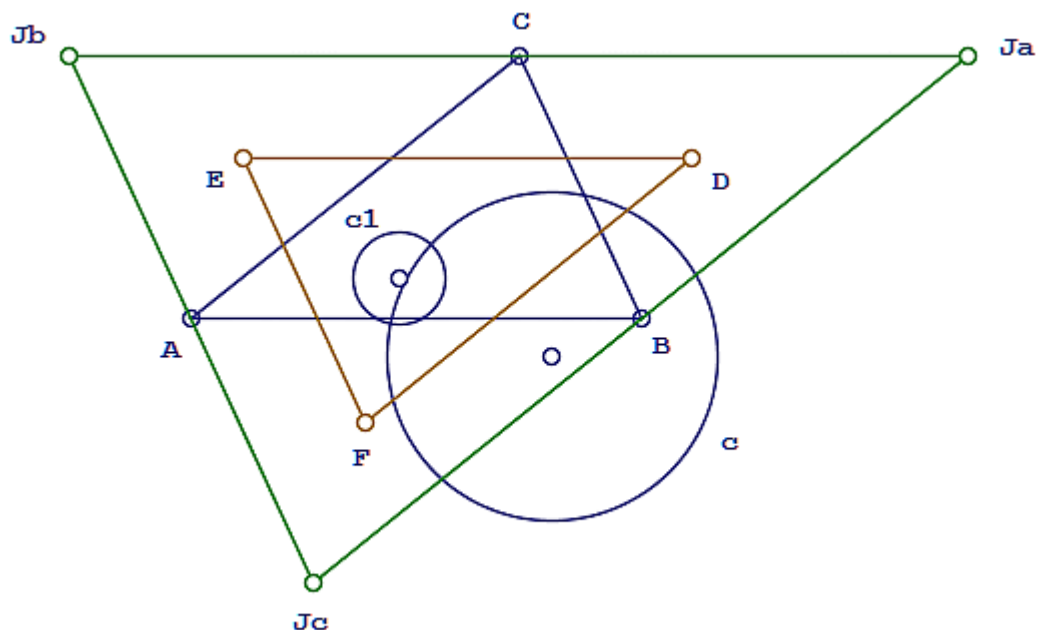
#### **Short form of the problem:**

**Problem 7.** Prove that the Lester circle is orthogonal to the Orthocentroidal Circle of the Triangle of the Nine-Point Centers of the Anticevian Corner Triangles of the Centroid.

The reader may find the definitions in [2-5].

Please submit the solution of the problem for publication in this journal to the editor of this journal: [ddekov@ddekov.eu](mailto:ddekov@ddekov.eu)

See the figure:



In the figure:

$c$  – Lester circle,

Triangle  $JaJbJc$  - Anticevian Corner Triangles of the Centroid.

Point  $D$  – Nine-Point Center of Triangle  $BCJa$ ,

Point  $E$  – Nine-Point Center of Triangle  $CAJb$ ,

Point  $F$  – Nine-Point Center of Triangle  $ABJc$ ,

$c_1$  - Orthocentroidal Circle of Triangle  $DEF$ ,.

Circle  $c_1$  is orthogonal to the Lester circle.

## References

1. Dekov, D., Computer-Generated Mathematics: Seven Circles orthogonal to the Lester Circle, Didactical Modeling, 2008, [http://www.math.bas.bg/omi/DidMod/Articles/D%5B1%5D.Dekov\\_Lester\\_Circle.pdf](http://www.math.bas.bg/omi/DidMod/Articles/D%5B1%5D.Dekov_Lester_Circle.pdf)
2. Sava Grozdev and Deko Dekov, Computer-Generated Encyclopedia of Euclidean Geometry, 2014, available at the Web: <http://www.ddekov.eu/e2/>
3. Eric W. Weisstein, MathWorld - A Wolfram Web Resource, <http://mathworld.wolfram.com/>
4. Quim Castellsaguer, The Triangles Web, <http://www.xtec.es/~qcastell/ttw/ttweng/portada.html>
5. P. Yiu, The Circles of Lester, Evans, Parry, and Their Generalizations, Forum Geometricorum, 10 175–209.

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